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A GEOGRAPHICAL ANALYSIS OF TRENDS IN U.S. WATER RIGHTS LAWS (WI--ETC(U)
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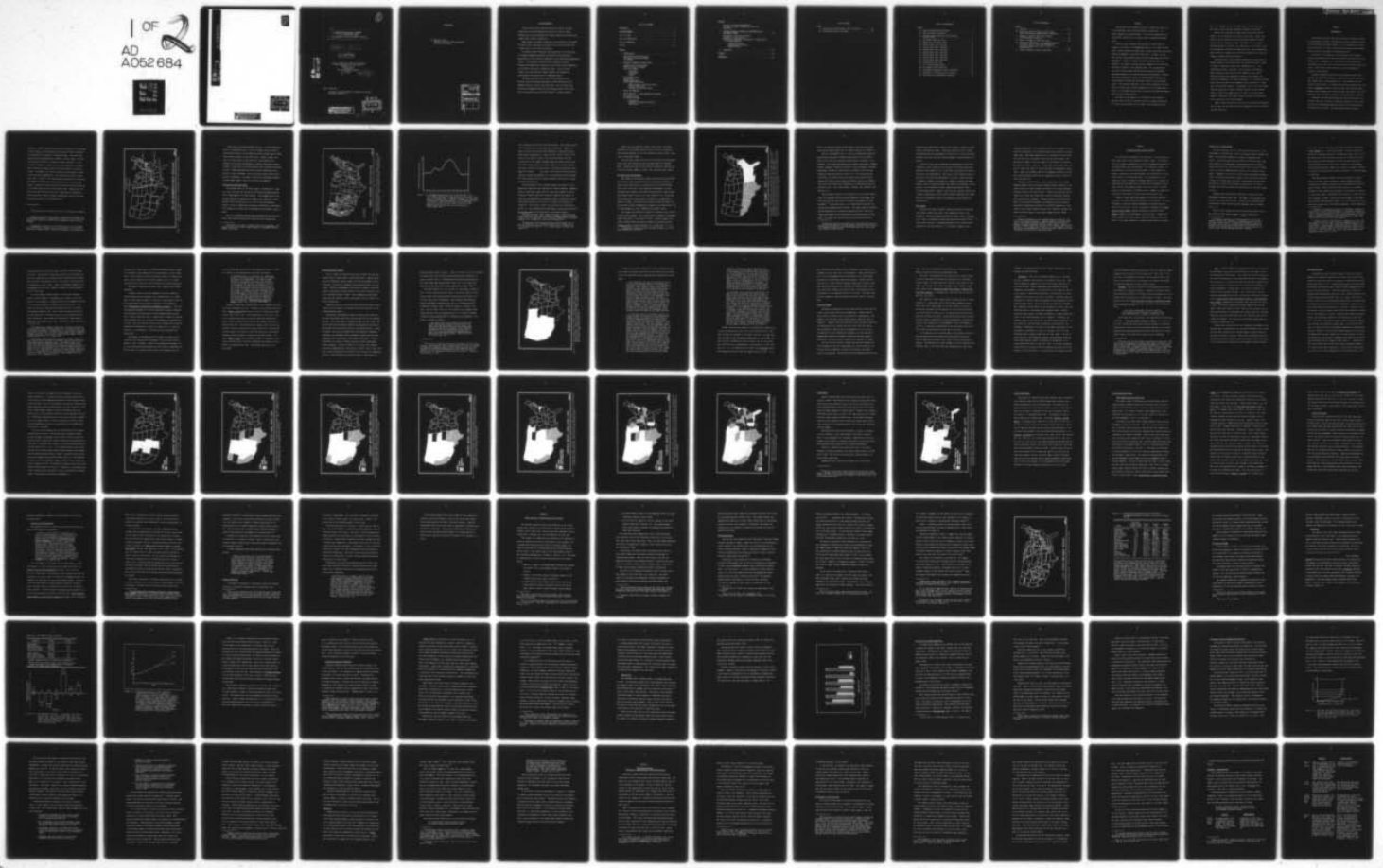

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(6) A GEOGRAPHICAL ANALYSIS OF TRENDS
IN U.S. WATER RIGHTS LAWS
(With Emphasis on the Southeastern States)

(9) Master's thesis,

by

(10) James J. May

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Assistant Professor Everette N. Bannister, Chairman
Professor George Kish

228 600

DEDICATION

To Millie, my wife
Michele, Chris and Greg, my children
My very best friends

ACKNOWLEDGEMENTS

None of this would be possible without the help of the many people and my fellow classmates who have put up with my verbal searches for the true problem and my endless questions which must have seemed either trivial or pointless.

Many thanks to Professor Joseph Sax of the University of Michigan Law School whose course was so difficult for me that the extra time I spent led me to the topic of my thesis.

Professors Everette Bannister and George Kish of the University of Michigan Geography Department encouraged me and developed my appreciation of the historical importance of the legislative/geographical trends. I am indebted to Professors Rolf Deininger, Jonathan Bulkley and Richard "Pete" Andrews, who have given me this opportunity and literally forced me to condense my topic. And, my sincere thanks to the many state and federal agencies who answered my questionnaire and inquiries with a tremendous effort.

My family, they are last on the list but should be first. Michele, Chris and Greg who have gone too often without me, may I someday be able to justify their sacrifices. And, to Millie, who has been my companion during the cold Michigan winters; she is more than a loving wife; she is my "best friend" -- thank you Millie!

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PREFACE

The problem of world hunger continues to plague each one of us, if not physically, then certainly morally or emotionally. In America hunger still exists though it is far less pronounced due to one specific attribute of our country; there is generally adequate water.

Water, no less a resource than minerals or fossil fuels, is taking on the aspect of an "endangered species." And, while we have laws to protect eagles and beagle pups, our water laws have historically lacked the emphasis to deal with future needs. Instead, our laws deal with our water problems along the idea of what many call "crisis management." Studies of federal and state water laws show this resource to be unique, requiring special treatment in the courts and individual treatment in the planning field. Yet, we <u>can</u> plan for the future of water needs through multi-disciplinary, systematic approaches adapted to fit specific needs and circumstances. Studies and surveys intended to further the understanding of physical and socio-economic variables are absolutely essential to any planning effort. But even more important is the citizen realization that the need for further water resource planning is not of secondary importance; it is perhaps the most critical concern of the American people and it must be confronted now!

My intent in this thesis is to look back on some trends in American water law and to indicate the need to change existing laws in a most critical region of our country, the southeastern states.

Here I will attempt to point out what appears to be an oversight in the field of water resource management, research and planning.

Ideally, the following work may someday serve some practical purpose. It is certainly not the work of one person. Rather, the words are my own reflections upon professional comments, academic lectures, and the readings of what I discovered to be a litany of talented authors in the field. But even more, it is a certain intuitive feeling that the future problems which will involve southeastern water resources of America have not been scrutinized as yet and that immediate research needs are essential.

My beliefs were, in my own mind, confirmed in a reply from the General Counsel of the United States Water Resources Council (James R. Readle to James May, 3 March 1977, Washington, D.C.). In a questionnaire format I had asked: "Are the laws of the Southern States adequate to deal with the water demands of the future?" While the question was, admittedly, presented very broadly, the answer was staggering. Mr. Readle stated that: "...the Water Resources Council does not possess any information that could begin to answer this very difficult question." Furthermore, "we do not at the present time have any plans to answer a similar question for the Southern States in either the energy area or as a part of the total water demand." Simply put, the Council could not answer the question and had no plans even to survey the region.

Again, intense research into this area of study has been neglected far too long. My only hope is that the realization occurs in time for adequate resolution.

CHAPTER 1

Introduction

Man normally interacts with the surrounding environment governed by laws imposed by society. Nevertheless, society continually alters its laws as needs and desires change. It is the expression of these needs and desires that form strong legislative impacts and eventually become new laws or amendments to existing statutes.

The motives for changes are not exclusively social, however. Quite often transitions are the result of physical restrictions (e.g., climate, soil, topography, etc.) which inhibit the application of traditional rules, thus, laws are altered out of necessity rather than desire. The history of American water law provides examples of changes for both reasons.

European immigrants brought with them traditional water laws. In America, the laws served them well, initially, but after a time customs changed due to social pressure (e.g., new industries and new methods of agriculture). As pioneers and settlers traveled west, they found the physical conditions quite different than they were accustomed to both in Europe and in America's east coast region. New laws developed, this time due to the nature of these physical conditions.

Transitions are usually difficult and drawn-out processes. But settlers found that the need for change was essential to their existence and that painstaking legislation and political bargaining were necessary evils of growth. The main problem identified was the

absence of a useful legal structure which could deal with the problems of water supply (in a predominantly arid area) and which considered the irregularity of naturally occurring rainfall. The answer that developed was the *Appropriation Doctrine*[1] of water rights. The doctrine suited the needs of the western settlers precisely. It encouraged development of large tracts of land (primarily for agriculture), and did not require that the land be adjacent to the watercourse. Furthermore, the doctrine provided a secure amount of water to the most *senior appropriator*, the owner who was "first in time (was) first in right."[2] This appropriation doctrine was a contrast to the *Riparian Doctrine* known well in both Europe and the east coast states. Riparian law required that water adjoin the land and that use of the water could only be on that adjacent land. Riparian law further stated that the water could not be substantially diminished in either quantity or quality, whereas, appropriation owners could take every drop of water, for a *beneficial use*.[3]

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[1]Italicized words will identify entries in the glossary, Appendix A.

[2]Appropriation gave strong impetus to economically efficient use of the water resources of the west and in doing so, also provided each appropriation state with a great deal of regulatory control over the resource.

[3]Economically feasible use of the resource was not the fundamental consideration of riparian law, rather protection of all private rights was a primary concern, often at the expense of the public good.

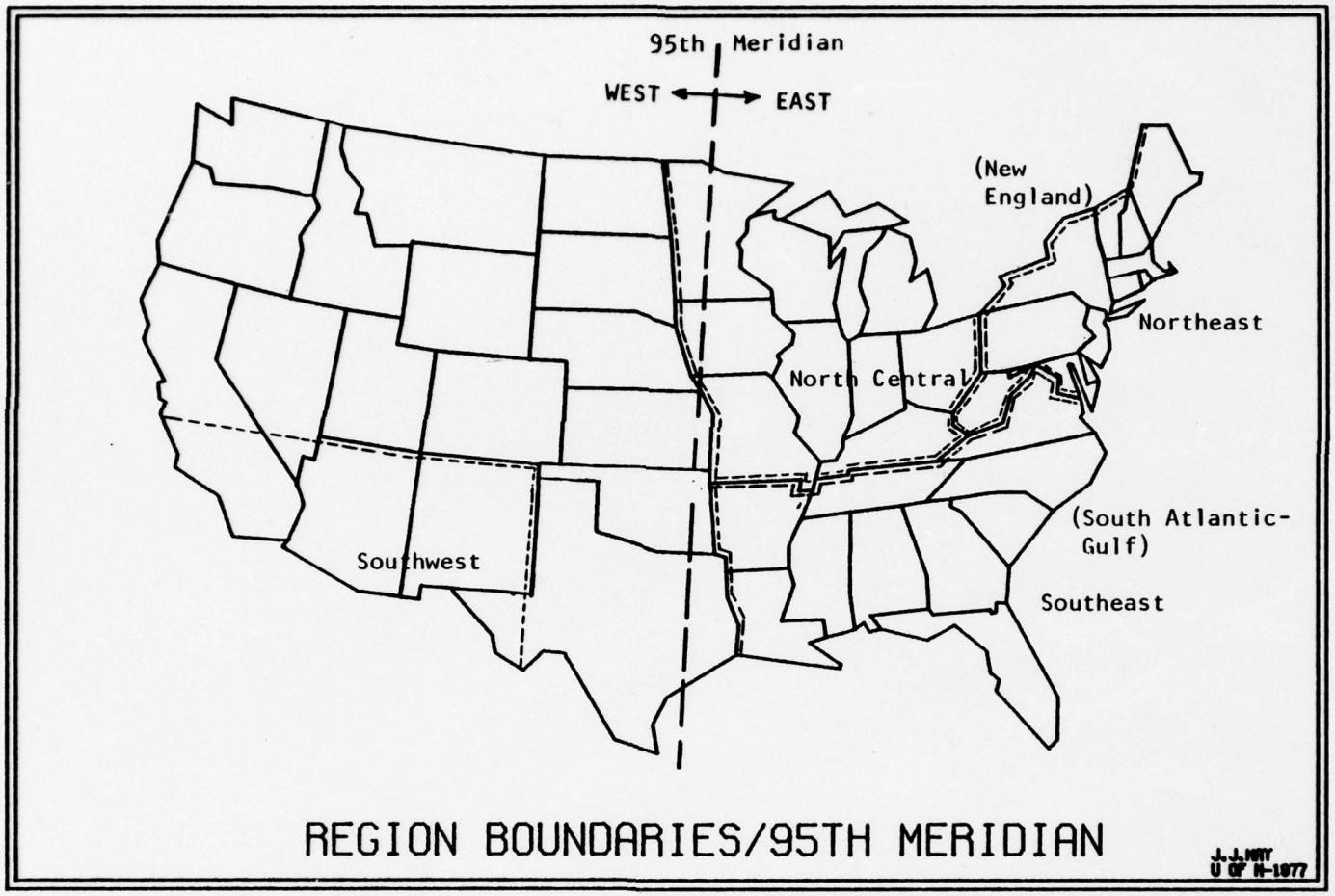

Figure 1.1 -- Region Boundaries/95th Meridian. The boundaries are those used by the author throughout the text.

States east of the *95th Meridian* (see Fig. 1.1) have tenaciously held on to riparian doctrine. Years of drought during the 1930's[4] caused severe losses to the mid-western states and they began to seriously consider changes in their water laws. Another drought, this time on the east coast, in the mid-1960's, drew greater public attention to the need for regulation of quantity and quality aspects of water. States west of the 95th Meridian have constantly encouraged the east to adopt appropriation-styled doctrines emphasizing "certainty" in time of shortage. And, the eastern states coalesced for a period of reappraisal, as economic, social and environmental demands on water supply began to take on an entirely new emphasis.

Precipitation and Water Supply

The ultimate source of all water supply is precipitation. Rainfall, snow, dew, hail and fog make up the National average precipitation of approximately 30 inches annually. This average value is deceiving, however, for spatially the supply is much greater in those eastern states discussed above (i.e. east of the 95th Meridian). Figures 1.2 and 1.3 graphically portray the distribution of precipitation leaving little doubt that the *southeast* has an abundant supply of water.

Just as a countrywide analysis shows precipitation data state-by-state, each state has regions that exceed the state average while

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[4]This region of drought is commonly known as the Dust Bowl. Mid-western farms, dried by the drought, began to disintegrate as winds removed the topsoil.

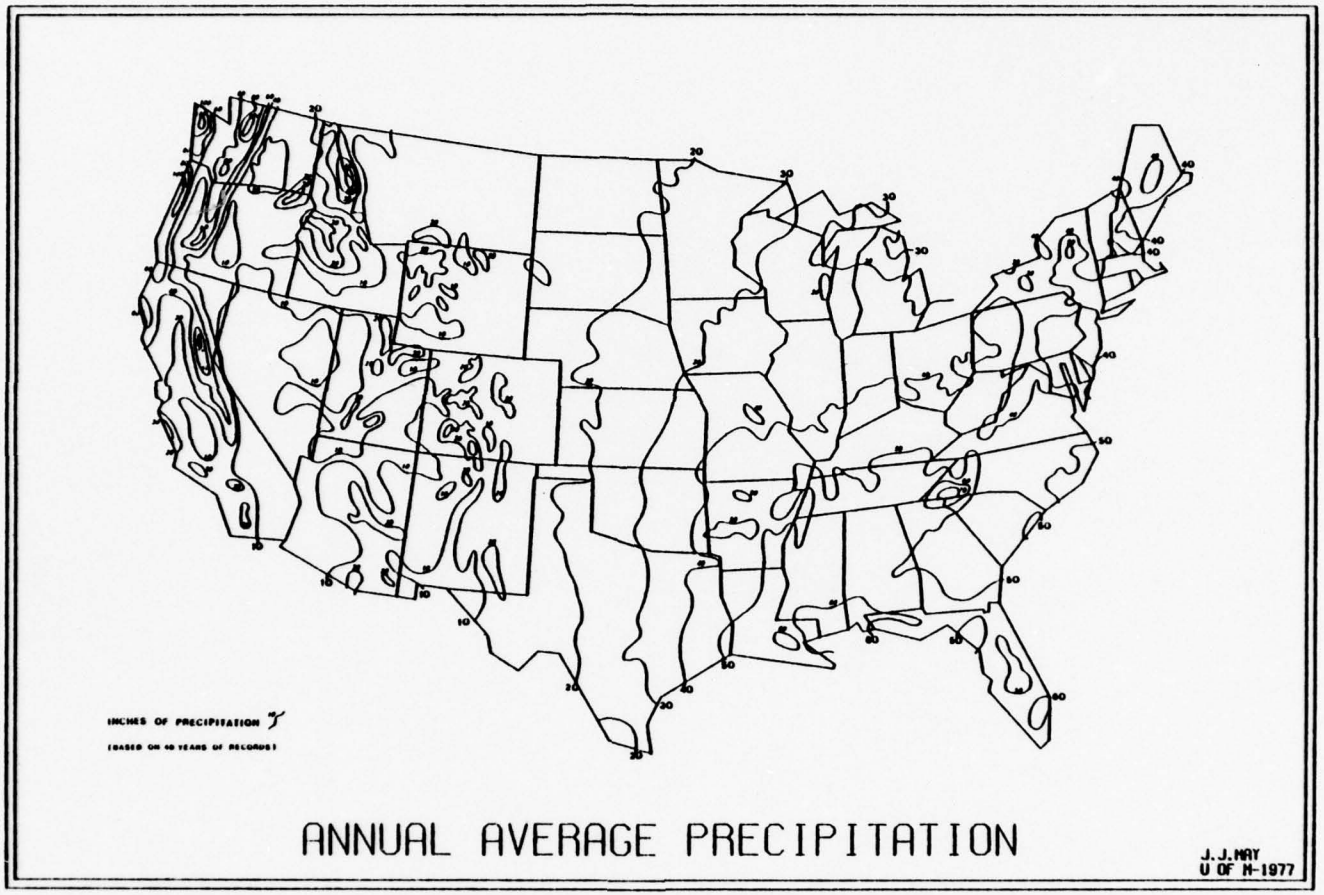

Figure 1.2 -- Annual Average Precipitation. Note extreme variations from west to east in Washington and Texas and the local wet area of North Carolina, South Carolina and Georgia. (Source: NOAA and U.S. Dept. of Agriculture)

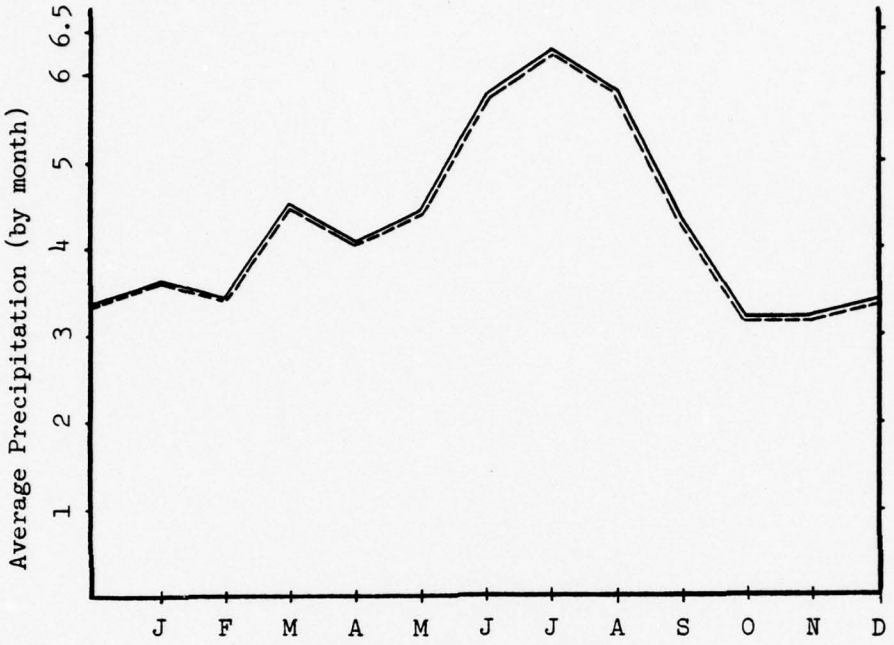

Figure 1.3 -- Average Monthly Precipitation, Southern States. The above figure represents the mean monthly precipitation in the south on a monthly basis. Compared to figure 1.2, local and seasonal variations become obvious. (Calculations were based on 40 years of records of NOAA and the U.S. Department of Agriculture; values represent region average as determined by state averages over the 40 year period.)
Source: NOAA, 1970.

other regions fall well below the state average. Some examples should show the significance of this physical circumstance. Based on 40 years of record, the United States Department of Agriculture determined annual precipitation to range from less than 10 inches in west Texas to more than 50 inches in east Texas; Washington has some locales west of the Olympia Mountain Range that measure greater than 140 inches annually while the eastern section of the state measures less than 10 inches in certain areas. California precipitation has a range of 65 inches. The corner of the States of North and South Carolina, Georgia and Tennessee is a local high point which averages 80 inches annually while the states themselves record only 50 inches of annual precipitation.

The significance of the localized supply areas cannot be overemphasized, especially when dealing with localized demands. Aggregate supply in many areas simply does not equal local demands for water. Curiously, several states with restricted supplies and reserves of water are now experiencing a substantial growth in population causing even greater pressure on the ability to supply and allocate water resources.[5] Other states, those of the southeast (as identified in Figure 1.1), are experiencing the same types of population pressures,[6] but in this region the precipitation is considered adequate.

[5]Arizona, Colorado, Idaho, Nevada, New Mexico, Utah and Wyoming experienced growth rates of 14.9 percent or greater during the period 1 April 1970 to 1 July 1976, due to large net inmigration of permanent residents. U.S. average was 5.6 percent (see Appendix E).

[6]Southeastern states experienced growth rates ranging from 5.4 percent (Louisiana) to 24.0 percent (Florida) for the same period. U.S. average was 5.6 percent. (U.S. Census Bureau, 9 January 1977, Appendix E.)

Herein lies the essential concept of this study. The region identified as the southeast may be well on the way to substantial water-related problems, not so much problems of supply, rather, allocation of available supply.

One must keep in mind that relative to the west and southwestern states, east and southeastern water problems might be considered minor. Nonetheless, many of the potential southeastern problems can be averted through changes in states' laws concerning water rights.

The Sunbelt and the Southeast

The drought in the American eastern states during the mid-1960's did much more than cause agricultural and industrial hardships; it woke up state legislatures to the possibility that water problems could occur in the east. Long considered insusceptible to water shortages, many eastern states entered the period with legal systems which simply wouldn't work in low flow situations (i.e., situations where stream flow is below normal and quantity is insufficient to supply all needs). Efficiency and allocation became key issues and the existing doctrine (predominantly riparian) was already known to be too time-consuming to solve "immediate requirement" issues.

The drought also served as a prelude to a massive social trend to protect the environment. But, as the thirst for greater environmental conservation grew, so did thirst for water. Greater supplies were needed, demands shifted and people reached for entirely different lifestyles, often incorporating water as a primary need.[7] In the

[7]Recreational boating, fishing, canoeing, swimming, etc., have grown tremendously since 1970.

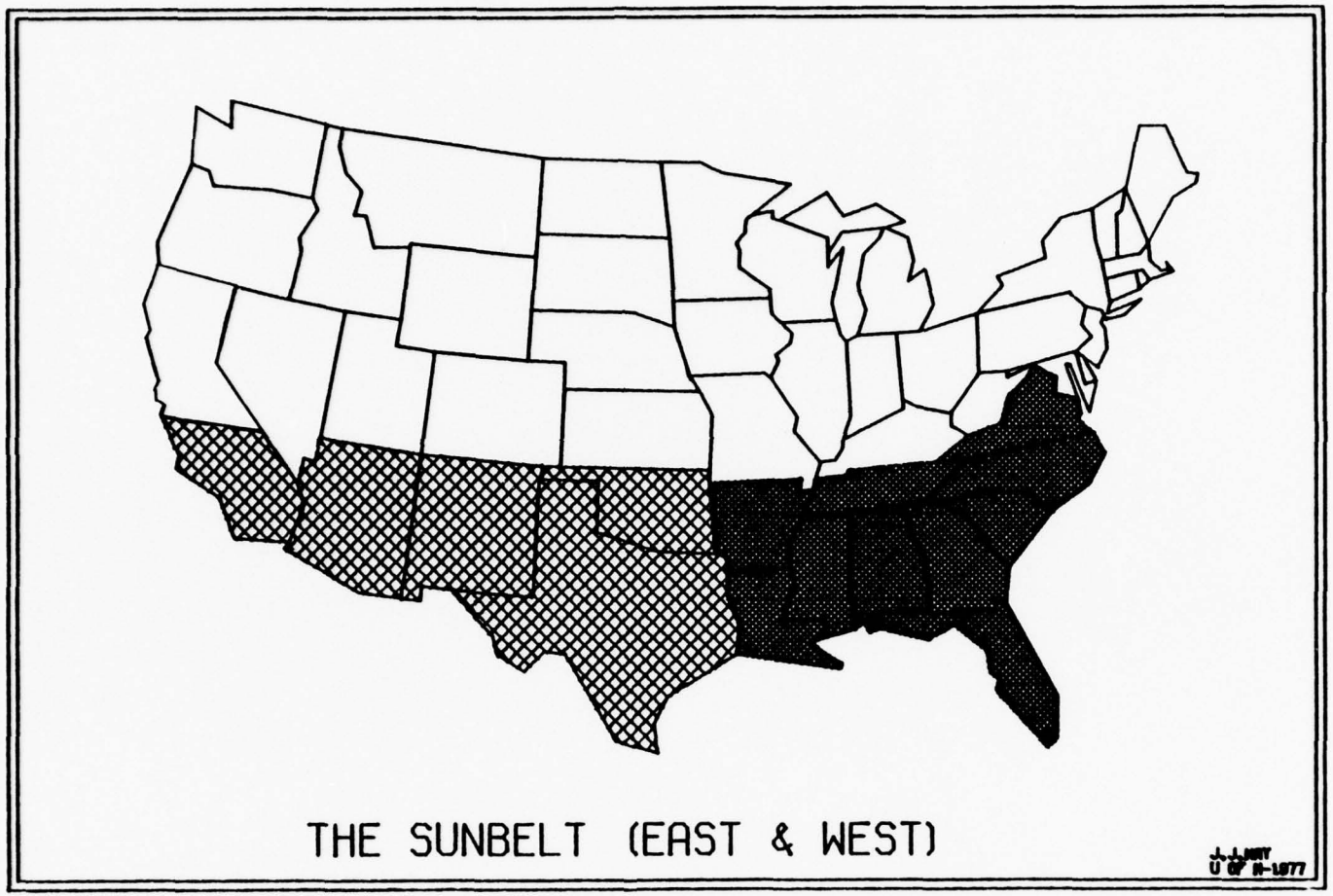

Figure 1.4 -- The Sunbelt (East and West). The shaded pattern of the above figure represents the sunbelt. The darker shading identifies the area of this analysis where existing water rights statutes are in question. The lightly shaded area identifies those sunbelt states whose water laws, though admittedly they cannot solve the quantity allocation problem which exists, can adequately deal with growth demands on available water supplies.

1970's, the American population also began to move away from large urban areas; people headed south for warmer climates (see Chapter 3).

Both the *southwestern* (Fig. 1.1) and the southeastern states began explosive population increases during the early to mid-1970's. After a short time, the migration became known as a movement to the "*Sunbelt*." The states that made up this sunbelt region were: Alabama, Arizona, Arkansas, (Southern) California, Florida, Georgia, Louisiana, Mississippi, New Mexico, North Carolina, Oklahoma, South Carolina, Tennessee, Texas and Virginia (Figure 1.4). In a seven-year span (1970-1976), the sunbelt states (and several other western states) overcame an 8 million person population deficit and has now reached a point where they outrank the *northeastern* and *northcentral* states in population size. (U.S. Census Bureau, 9 January 1977, Appendix E and see fig. 1.1).

Water resources relate to this migration in two distinct aspects. First, the southwest has limited water supplies, but also <u>has</u> a doctrine which can deal with both the increased development and water shortages.[8] On the other hand, it is a traditional belief that the southeast has abundant water resources. The actual quantity available and the legitimacy of the existing riparian doctrine to deal with large-scale demands of the future are the motivating factors of this paper. For, given the projected population growth and potential

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[8]Though there may be some question as to the political reality of solving the water problems, the appropriation doctrine itself can provide adequate solutions to conflicts between water users and allocations between interest groups.

industrial and agricultural trends in the southeast, demands for water cannot be ignored any longer. Additional demands for water include recreational uses and requirements for protection of fish and wildlife habitats; these uses add still greater demands on water resource allocations.

Since the first states recognized the appropriation doctrine for regulation of water resources, more and more states have adopted the doctrine in what appears to be a trend which is spreading from west to east across the United States. This trend in water resource policy is detailed in the historical development of the water rights doctrines in Chapter 2, Figures 2.2 through 2.8. Chapter 3 analyses the demographic trends in population growth and industrial development as they pertain to the southeastern states, emphasizing potential water-related problem areas. Chapter 4 shows the three systems of water law (riparian, appropriation and the *permit system*) regarding their adaptability to southeastern states now undergoing the rapid growth explained above.

The Problem

Conflict over water allocation represents the most crucial problem in water resource law today. The southeastern states, from Virginia to Florida to Arkansas, provide the area of focus. Valuable water, land, sun, manpower, mineral and recreation resources in the south should continue to encourage immigration while placing drastic pressures on the same resources. It is therefore suggested that

increased immigration to the southeastern part of the sunbelt will induce the continuation of the eastward trend in the transition of water rights laws. Additional regulation will be essential in those states that have not as yet anticipated conflicts over water rights. But, the need for change is now; the urgency of the situation is growing. The time for concern is upon us. In many cases and in many areas, the lack of concern may result in future hardships of unimaginable proportions. Again, the problems stem from the aggregate pressures of population and industrial growth and the substantial conflicts certain to arise over water use.

Statewide concern for this critical problem may not be enough. Regional emphasis may not stimulate adequate capital resources to adequately survey the water resources and needs of this rapidly-growing southeast corner of the United States. Indeed, the growth has been so recent and so rapid that future water resource projections based on 1970 trends are now inadequate. Federal attention may become fundamental to any possible geographic, environmental or water resource legislative alternatives available as solutions.[9] Cooperation of the states in the crucial problem areas may avert difficult, extended conflicts over water rights in the future, perhaps the near future.

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[9] Federal intervention is not presented here as a proposal, but rather as a potential necessity. Federally-imposed pollution standards or even federally-backed transfer of water from one basin to another (interbasin transfers) may have severe impacts. However, the severity of these impacts may be altered, not in a permanent irreversible sense, by the adaptation of state water rights legislation in coordination with potentially conflicting areas.

CHAPTER 2

Historical Trends in Water Rights

The introduction emphasized the acute need for the alteration of water rights laws in the southeastern sunbelt states. The change in the law is simply an extension of a trend of changes which occurred in the United States from the beginning of the nineteenth century. An understanding of the historical development of these changes and trends is important to an understanding of the significance of water rights laws on a state-by-state basis. The continuation of such trends will lead to a number of secondary effects (i.e., spinoffs or ramifications) and adaptations in society such as immediate reuse of water directly from disposal plants or the use of water of reduced quality for agricultural or industrial uses. Perhaps, increased conservation of the resource will come from more efficient uses.

Reform of water rights laws appears to be the most practical solution to the water allocation problems in the southeast. It is the foundation of improved resource management and planning decisions which will occur there. But it is important to emphasize that trend need not equal destiny; adequate solutions are possible without drastic changes to the environment or existing laws. Economic and social changes may provide equally effective solutions, still, the fabric of our future requires us to make the best possible decisions.

Origins of U.S. Water Rights

Over the centuries, the use of water has been a mainstay in the development of civilizations. Great civilizations found in present day Egypt, India and China depended on irrigated or hydraulic agriculture. Such agricultural methods usually required individual access and proximity to a water supply. Discussing the orbital community pattern which may very often develop around a water source, Wittfogel (1956, pp. 152-164) emphasized the necessity of an accessible water supply. Immigrants have not set up such orbital environments randomly, rather, the pattern was directly related to the availability and ease of access to a usable water resource.[1] Nevertheless, with decreased availability of water there developed an extension of the orbital boundary, more difficult access and eventually laws or specific rights to water.

European water laws exerted a significant influence upon the development of American water laws. The legacy of the European laws has been long-lived and persistent. Indeed, much of American water jurisprudence evolved directly from the European tradition (Thomas, 1970, p. 7).

Years of social change have diluted the French influence to the point where the only obvious remnant of <u>law</u> is restricted to

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[1]Wittfogel's description of the development of the orbital community involves the dependence of farming production on small plots near a water source. As populations became more dense the distances from the main source became greater and transportation of water to the new population areas took on orbital patterns (e.g. Cordova, Spain; London, England; Frankfurt, Germany).

Louisiana.[2] In this state, the civil code classifies running water as *res communes*, or "...that which belongs to nobody in particular and which all men may freely use." (Dewsnup and Jensen, 1973, p. 347.) The French Civil Code was derived from the Code of Napoleon of 1804 which states that the ownership of the land includes ownership of everything above and below the surface. Relative to water rights, specifically ground water rights, this concept is pervasive in riparian states[3] and thereby shows the French influence not restricted only to Louisiana.

The Spanish-Moorish influence was more pronounced in several areas of the west. Here the holders of rights granted from prior sovereigns were commonly recognized by new governments as having the superior right. Before the United States evolved to its present boundaries, Spain, Mexico and the Republic of Texas were the sources of these water rights. The Spanish Law of Waters is a clear and concise statement of rights, limitations and privileges of individuals and the public regarding water supply. It is well-suited to the climate both of Spain and of the American southwest. Moslem dominance in

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[2] Remnants of the law are restricted to Louisiana. However, effects of the law can be found elsewhere. In Michigan, and specifically Detroit, land use patterns reflect the French law. Plots adjacent to a waterway often have a short riparian frontage with long, narrow boundaries extending back from the waterfront. Today, even census tracts in Detroit follow this pattern.

[3] "Common things are insusceptible of ownership, but since they are subject to use by all men, it has been suggested that it is not unreasonable to conclude that running water may be segregated, at which point it becomes capable of private ownership," which is the case in most riparian states as well as states which adhere to other doctrines. (La. Civil Code, art. 482 as cited and interpreted by Dewsnup and Jensen, 1973, p. 347.)

Spain developed very strict, but open, laws about both water usage and access. Agricultural irrigation as practiced by the Moslems became the cornerstone of the Spanish law and established that economically efficient and beneficial uses of the resource were required for an individual to claim a right. Today, the essential elements of the Moslem-Spanish law are the foundation of America's western appropriation[4,5] water laws.

The third system of water rights is of very minor influence. Known as "*pueblo rights*," the paramount use or right to all of the water is to the community. Normally limited to the immediate vicinity of a town, pueblo rights are perpetual and may not be lost. The rights as they exist today are all accepted as prior to the Treaty of Guadalupe Hidalgo in 1846. Pueblo rights can only be found in a few municipalities in the United States such as Los Angeles and San Diego, California. These rights are significant in cases where an urban area is situated along a river. According to Pueblo rights, the

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[4]The Spanish Law of Waters states that, the owner of an estate owns all pluvial waters falling thereon (Art. 1), the waters that rise as springs or headwaters of streams (Art. 5), the waters of lakes and ponds on his estate (Art. 17), and the subterranean waters obtained by ordinary wells (Art. 18), defined as wells dug for domestic use and operated manually (Art. 20). (Shaw, 1922)

[5]The General Theory of Waters in Moslem law permits rights acquired by actual use of water; its strength lies in the protection of those rights against subsequent users. Any landowner may utilize pluvial and other intermittent waters which flow on public areas (Arts. 16, 176, 177); after use for one year he establishes a superior right to that of any subsequent user -- "first in time is first in right" (Art. 7); after use for 20 years the right becomes "indefinite" (Art. 8). The landowner has a right only to the specific quantity of water he actually uses, but this right is valid regardless of the source (Art. 10). (Caponera, 1954)

city may take so much water as it declares necessary and may increase its withdrawal to meet demands with no consideration to other stream users. Such a claim could have far-reaching effects on a large river such as the Rio Grande or the Colorado (Thomas, 1970, p. 10) where the entire flow of the river could be diverted by a single metropolis.

The impact of English water rights laws on America was of great importance.

Pilgrims, settlers, and other immigrants arrived on America's eastern seaboard with the English rule of *natural flow* (i.e., Every owner of land along the banks of a river has an equal right to the use of the water which flows through or adjacent to the proprietor's lands undiminished in quantity and unimpaired in quality.). This concept appeared reasonable for the late eighteenth and early nineteenth centuries where bountiful rainfall created equally generous stream flow. However, under this rule, no rights exist on lands not riparian to the stream or for use of the water for purposes not connected with the land. Thus, any transfer of water for an intended use on land not adjoining the stream was in violation of common law (i.e., known as transfer to a *non-riparian*). Land use and water use/access went hand-in-hand.

The adoption of the English rule of natural flow seemed inevitable since even the physical environment of the new world was comparable to that of England. However, the anticipated development did not occur; the Americans developed their own concept of *reasonable use*. Possibly more of a hindrance than an asset, the reasonable use rule

of the riparian doctrine has never been adequately defined. In 1883 the criteria of reasonableness was discussed in Minnesota:

> In determining what is a reasonable use, regard must be had to the subject-matter of the use; the occasion and manner of its application; the object, extent, necessity, and duration of the use; the nature and size of the stream; the kind of business to which it is subservient; the importance and necessity of the use claimed by one party, and the extent of the injury to the other party; the state of improvement of the country in regard to mills and machinery, and the use of water as a propelling power; the general and established usages of the country in similar cases; and all the other and ever-varying circumstances of each particular case, bearing upon the question of the fitness and propriety of the use of the water under consideration. (Red River Roller Mills v. Wright, 30 Minn. 29, 15 N.W. 167, 169 (1883).)

Through the years many interpretations of the reasonable use rule have been incorporated into law. Perhaps the most influential was the case of *Mason v Hoyle* (Supreme Court of Errors of Connecticut (1888) 56 Conn. 255, 14 Atl. 786.). The interpretation of the court's decision to maximize social gains in-lieu-of individual ownership and profit has had a profound effect on both the riparian doctrine and American water law. The ruling that any riparian owner could use any quantity of water he might want so long as there was no interference with the actual use by others of their fair share, was a substantial digression from the Minnesota ruling only five years earlier. The case of Mason v. Hoyle set yet another precedent in declaring a clear division between land and water by recognizing the transfer of water rights, for reasonable use, onto non-riparian land was "not unprivileged."

Time and Place for Change

Prior to 1860 the riparian doctrine was virtually the only recognized system of water rights in the United States. Eastern states had well established riparian rights, but with the movement of settlers west, the belief in unlimited water supply was seen to be only a myth. Physical and geographic limitations of climate, terrain and rainfall established the harsh reality of the west's inability to insure a reasonable supply of water. This inadequate and unreliable supply made the riparian doctrine inconsistent with the region's resource availability.

Regarding water law, the eastern-based Federal Government turned a deaf ear to the needs of the western territories which had not yet reached statehood status.

Nonetheless, homesteaders, farmers and miners were moving west and they had different needs than could be dealt with by the riparian doctrine. The people began to appropriate water for their uses. The western settlers developed and adopted the Appropriation Doctrine of water rights which was better suited to their peculiar needs. During the 1860's, the Civil War eclipsed water law problems in immediate importance; the Government was not prepared to discuss any new laws. Recognition was slowly given to the western territories; it was accomplished by a series of Federal legislative actions encouraging western migration. The Act of 1862 (C. 75, 12 Stat. 392; commonly known as the Homestead Act), and the Acts of 1866 (C 262, 14 Stat. 251; often called the Mining Act) and 1870 (C. 235, 16 Stat. 217, ammending the Act of 1866) granted land and water rights to homesteaders and

thereafter water rights to miners. Rights for miners could not be riparian for miners didn't own the land; they were merely given permission to extract minerals from it. Homesteaders were granted *patent lands* and with these lands went riparian water rights, but, at the same time, some farmers and miners were claiming appropriative water rights.[6]

The *Desert Land Act* (c. 107, 19 Stat. 377) was passed on March 3, 1877. The Act specified certain areas of land in the states of California, Oregon, and Nevada (to which Colorado was later added), and the then territories of Washington, Idaho, Montana, Utah, Wyoming, Arizona, New Mexico, and Dakota (see Fig. 2.1) allowing entry and reclamation of desert lands. There was, however, a proviso to the effect that the right to the use of the waters by the claimant shall depend upon bona fide prior appropriation, not to exceed the amount of waters actually appropriated for irrigation and reclamation. The proviso is quoted as follows:

> ...all surplus water over and above such actual appropriation and use, together with the water of all lakes, river and other sources of water supply upon the public lands and not navigable, shall remain and be held free for the appropriation and use of the public for irrigation, mining and manufacturing purposes subject to existing rights. (Desert Land Act, Ch. 107, 19 Stat. 377.)

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[6]"If the Acts of 1866 and 1870 did not constitute an entire abandonment of the common-law rule of running waters in so far as the public lands and subsequent grantees thereof were concerned, they foreshadowed the more positive declarations of the Desert Land Act of 1877, which it is contended did bring about that result." (Meyers & Tarlock, 1971, p. 139.)

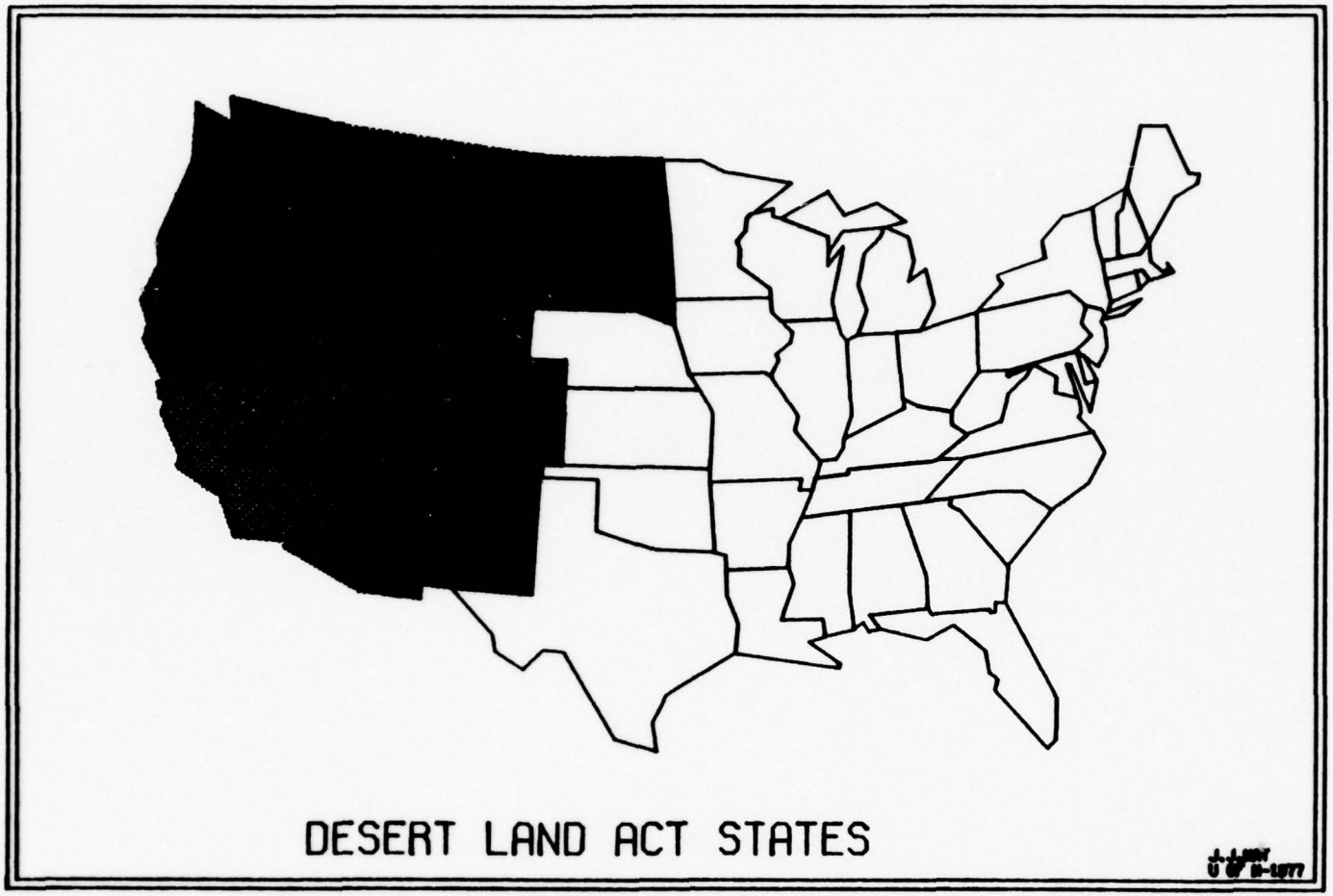

Figure 2.1 -- Desert Land Act States (1877). California, Oregon, and Nevada were the original Desert Land Act States. Later, as Colorado, Washington, Idaho, Montana, Utah, Wyoming Arizona, New Mexico and the Dakotas became states, they provided new settlers with land and water rights designated by state law.

Perhaps a quote from a decree by Mr. Justice Sutherland, resident, lawyer and Senator from Utah will best describe the situation of the late nineteenth century regarding land reclamation and water rights.

> In the beginning, the task of reclaiming this area was left to the unaided efforts of the people who found their way by painful effort to its inhospitable solitudes. These western pioneers, emulating the spirit of so many others who had gone before them in similar ventures, faced the difficult problem of wresting a living and creating homes from the raw elements about them, and threw down the gage of battle to the forces of nature. With imperfect tools, they built dams, excavated canals, constructed ditches, plowed and cultivated the soil, and transformed dry and desolate lands into green fields and leafy orchards. In the success of that effort, the general government itself was greatly concerned -- not only because, as owner, it was charged through Congress with the duty of disposing of the lands, but because the settlement and development of the country in which the lands lay was highly desirable.
>
> To these ends, prior to the summer of 1877, Congress had passed the mining laws, the homestead and preëmption laws, and finally, the Desert Land Act. It had encouraged and assisted, by making large land grants to aid the building of the Pacific railroads and in many other ways, the redemption of this immense landed estate. That body thoroughly understood that an enforcement of the common-law rule, by greatly retarding if not forbidding the diversion of waters from their accustomed channels, would disastrously affect the policy of dividing the public domain into small holdings and effecting their distribution among innumerable settlers. In respect of the area embraced by the desert-land states, with the exception of a comparatively narrow strip along the Pacific seaboard, it had become evident to Congress, as it had to the inhabitants, that the future growth and well-being of the entire region depended upon a complete adherence to the rule of appropriation for a beneficial use as the exclusive criterion of the right to the use of water. The streams and other sources of supply from which this water must come were separated from one another by wide

> stretches of parched and barren land which never could be made to produce agricultural crops except by the transmission of water for long distances and its entire consumption in the processes of irrigation. Necessarily, that involved the complete subordination of the common-law doctrine of riparian rights to that of appropriation. And this substitution of the rule of appropriation for that of the common law was to have momentous consequences. It became the determining factor in the long struggle to expunge from our vocabulary the legend "Great American Desert," which was spread in large letters across the face of the old maps of the far west.
>
> In the light of the foregoing considerations, the Desert Land Act was passed, and in their light it must now be construed. By its terms, not only all surplus water over and above such as might be appropriated and used by the desert-land entrymen, but "the water of all lakes, rivers and other sources of water supply upon the public lands and not navigable" were to remain "free for the appropriation and use of the public for irrigation, mining and manufacturing purposes." If this language is to be given its natural meaning, and we see no reason why it should not, it effected a severance of all waters upon the public domain, not theretofore appropriated, from the land itself. From that promise, it follows that a patent issued thereafter for lands in a desert-land state or territory, under any of the land laws of the United States, carried with it, of its own force, no common-law right to the water flowing through or bordering upon the lands conveyed. (Justice Sutherland, as cited by Meyers and Tarlock, 1971, pp. 139-141.)

Several western states adopted or incorporated the appropriation doctrine governing water rights into their state/territorial water laws following the enactment of the Desert Land Act. Colorado, Montana, New Mexico, Utah and Wyoming established, in later years, that they had never recognized any other law and so are the only states which claim the law of appropriation as existing prior to 1850 (see Fig. 2.2). It is interesting that no other state <u>officially</u> recognized appropriation until after the Desert Land Act of 1877. It is

also significant that several states interpreted this Federal Act as a mandate to alter their laws to appropriation. States conceived this Act to be an infringement upon the sovereignty of the states where previously, the only known rights were riparian. Several conflicts occurred (i.e., These conflicts generally took place in state or Federal legislatures where states challenged the Federal right to dictate state law.). However, the need for such a law prevailed and to a large measure is the dominant water law of the west. The Desert Land Act gave credence to what had existed in practice prior to its enactment.

After the Change

Subsequent interpretations of the Desert Land Act affirm that the intent of the statute was often misinterpreted. Congress knew the land couldn't be farmed without a system akin to appropriation. The purpose of the Act was to give settlers land so that they could irrigate it. Congress could have said that a joint ownership under both the appropriation and riparian doctrines could exist with surplus water available to those outside the boundaries, but it is inconceivable that in 1877 Congress was intending to or even desirous of imposing any doctrine or litigation different from local desires. Nonetheless, the Act was often interpreted as a mandate for change.

This was the first period of change from what was understood to be an adequate doctrine for humid regions to a more structured, controlled doctrine necessary to balance the allocation and usage of water in arid regions. The 1862 and 1866 Acts prepared states for the

Desert Land Act by recognizing the impossibility of agricultural redemption without artificially irrigating the land.

The shift to an appropriation doctrine was not so much in question as was the abolition of what was considered to be individual property rights. Private owners were (and still are) unsure of their rights, and, whether their rights originated under federal or under state jurisdictions (California Oregon Power Company v. Beaver Portland Cement Company, U.S. Supreme Court, 1935. 295 U.S. 142, 55 S. Ct. 725, 79 L. Ed. 1356.).

This question of state versus federal jurisdiction was of "*equal footing*" (i.e., New states, at the time of their admission to the Union, are to have rights equal to all other states of the Union.). The Federal Government did not possess any of the land incorporated into the original 13 states, but it did own western territories which later were divided into states. These western states fought fiercely for their right to establish any law they pleased and, as stated previously, they considered it an infringement on their sovereignty to be "told" to establish an appropriation doctrine against their will -- even if they later altered the state laws on their own.

It is important here to develop some of the concepts relative to both the appropriative and riparian doctrines before tracing the trend of appropriation-related water rights through their migration eastward. The application of these concepts to the two doctrines will eventually lead to the theory that laws governing water rights must

"resemble" the appropriation doctrine to enable conservation of this valuable and unique resource.

Navigation. This rule is extremely complex; thus, it has been the most litigated of any concept in the history of water law. Originally, navigation addressed only those water bodies accessible by ship from the sea. Later, inland waters were addressed as either navigable or non-navigable. The distinction of the terms has been unclear, however. Under Federal definition, the watercourse is either nevigable for servitude, for title or for power. Servitude gives the Government the right to claim the waterway but must compensate for displaced property rights. Title is basically the same; the Government must compensate private owners for any acquisition of their land; land being that which is found lying under navigable waters. Finally, navigation power permits the Federal Government to condemn lands based solely on that land's potential use for commerce. (Initially, the *commerce clause* of the constitution was very narrowly interpreted, but as we shall see, the years have broadened the interpretation considerably.) Essentially, the power of the Federal Government over improvements for navigation in rivers is "absolute," that is to say, navigation takes a superior right over all other rights. The use of any stream for a valid navigation purpose can displace any other use (even *vested* property rights) to preserve the navigability of the stream (Daniel Ball Mich. 10 Wall. 557, 563). Yet another navigation concept evolved in Wisconsin where the emphasis was placed on the importance of the Great Lakes, "...the State test of navigation evolved

from the *Northwest Ordinance* stating that, 'the Great Lakes are common highways forever free and held for common use'." (804, Wisc.)[7] The state test for navigation is distinct from the Federal test; it centers on the accessibility of a waterbody to the public and declares the waterbody navigable if there is public access.

Diversion. This rule evolved out of the appropriation doctrine specifically for regulatory purposes. Though the watering of cattle was considered an exception, the private right of appropriation is dependent upon the diversion of a certain quantity of water. The court ruling in the case of City and County of Denver v. Northern Colorado Water Conservancy District (130 Colo. 375, 276 P. 2d 992) emphasized that,

> ...the rule is elementary, the first essential of an appropriation is the actual diversion of the water with the intent to apply to a beneficial use.

In the early west, this portion of the appropriation doctrine was inflexible. In City and County of Denver v. Miller, et al.(149 Colo. 96, 368 P. 2d 982) the court stated that the proposal to establish a minimum flow of water for various ecological purposes was an extreme departure from well-established doctrine and that there was no legislative intent in the State law to allow for such a departure.

---

[7]This was to be the Great Lakes' contribution to water laws. The outcome was the suppression of private water rights (riparian) in the name of public water rights (appropriation/navigation). The purpose of the rule was born in commerce, both in and on the Great Lakes themselves as well as through the tremendous pressure placed on local governments by the logging industry whose lumbering was of major importance during the later 1800's and exercised substantial influence on legislatures.

Waste. Another offspring from appropriation was the concept that the withdrawal of more water than one needed or could apply to land for beneficial use was unlawful. This aspect was tied very closely to the rule for diversion, for it was considered wasteful for an appropriator to hold (i.e., to store) that which was not useful instead of returning a portion of the diversion to the stream for withdrawal by a *junior appropriator*. *Instream uses* for fishlife, recreation and esthetics were considered wasteful. But in later years, both the diversion requirement and the ethic of waste were diluted by decisions such as Colorado River Water Conservation District v. Rocky Mountain Power Company (Supreme Court of Colorado, 1965. 158 Colo. 136, 406 P. 2d 798). This ruling recognized that public agencies did have the right to appropriate water for public desires; that diversion was not absolutely essential to appropriate when instream uses were considered beneficial, and that because these uses were beneficial they were obviously not wasteful. The ruling did not, however, equate public instream use to beneficial use.

Through these concepts and with the subsequent development of the eastward trend of appropriation one can easily determine that the laws are both being revised and are revising peoples' property rights according to the needs of society. These social requirements often become dictatorial when society provides the impetus for the reformation of land uses which in turn govern the development of water resources.

The Eastward Trend

As previously stated, Colorado, Montana, New Mexico, Utah and Wyoming never recognized riparian water rights. Thus, they are considered to be the only states to recognize the appropriation doctrine before 1850 (see Fig. 2.2). Following the passage of the Desert Land Act several other western states adopted exclusive appropriation doctrines (Arizona and Nevada). California, Washington, Texas, and Nebraska added appropriation statutes to their existing riparian laws during the period from 1850-1890 (Fig. 2.3). Again, this was the period of the Civil War and subsequent Reconstruction, priorities were not channeled in the direction of water legislation, rather, all efforts were aimed at the preservation of the Union. Toward the turn of the century, there was slightly more active state legislation intended to ease the hardships of settlers. Nebraska, North Dakota, Oklahoma, Oregon, and South Dakota adopted strictly appropriative laws (Fig. 2.4). World War I intervened and again diverted substantial legislative attention from concerns of water rights. The period 1910-1930 (Fig. 2.5) shows the State of Washington recognizing an appropriation doctrine. However, in 1913 the South Dakota Supreme Court ruled that the appropriation statute, adopted only six years earlier, was unconstitutional; the statute had not adequately accounted for the loss of private property with the change of water rights to appropriation. The period between 1930 and 1950 may be seen as somewhat stagnant in the realm of water rights legislation. The National economy reached an all-time low during the Depression and the Dustbowl years of the

1930's, and World War II demanded the total energies of state and Federal legislators. Yet, Kansas adopted the appropriation doctrine in 1945 and two states (Maryland and Minnesota) took innovative steps during the 1930's (Fig. 2.6) by adopting a new system of administering water rights known as the "*permit system*" (see also, Chapter 4). The need for water rights statutes to provide regulatory control was growing even in states normally considered to have adequate water supply. Maryland and Minnesota were two such states, and their recognition of the permit system is further indication of society's desire for such legislation as well as the gravitation of such administrative control to the east.

In terms of water legislation, the 1950-1970 period was unquestionably the most active. Nine eastern states (Arkansas, Georgia, Florida, Michigan, Mississippi, North Carolina, South Carolina, Wisconsin and most recently West Virginia) considered the desirability of switching to an appropriation system, but only Mississippi adopted the doctrine (Davis, 1971, p. 79). Of the remaining eight states, North Carolina and Wisconsin adopted *partial permit* systems, while Delaware and Iowa adopted exclusive permit systems. Indiana, Kentucky and New Jersey also adopted partial permit systems (Fig. 2.7). The movement continued into the southeastern sunbelt states of Florida (1972) and Georgia (expected in 1977, see Appendix B) taking on permit and partial permit systems respectively (Fig. 2.8). Virginia is also making moves toward a permit system in efforts to control and conserve the Commonwealth's valuable water resources (see Appendix B).

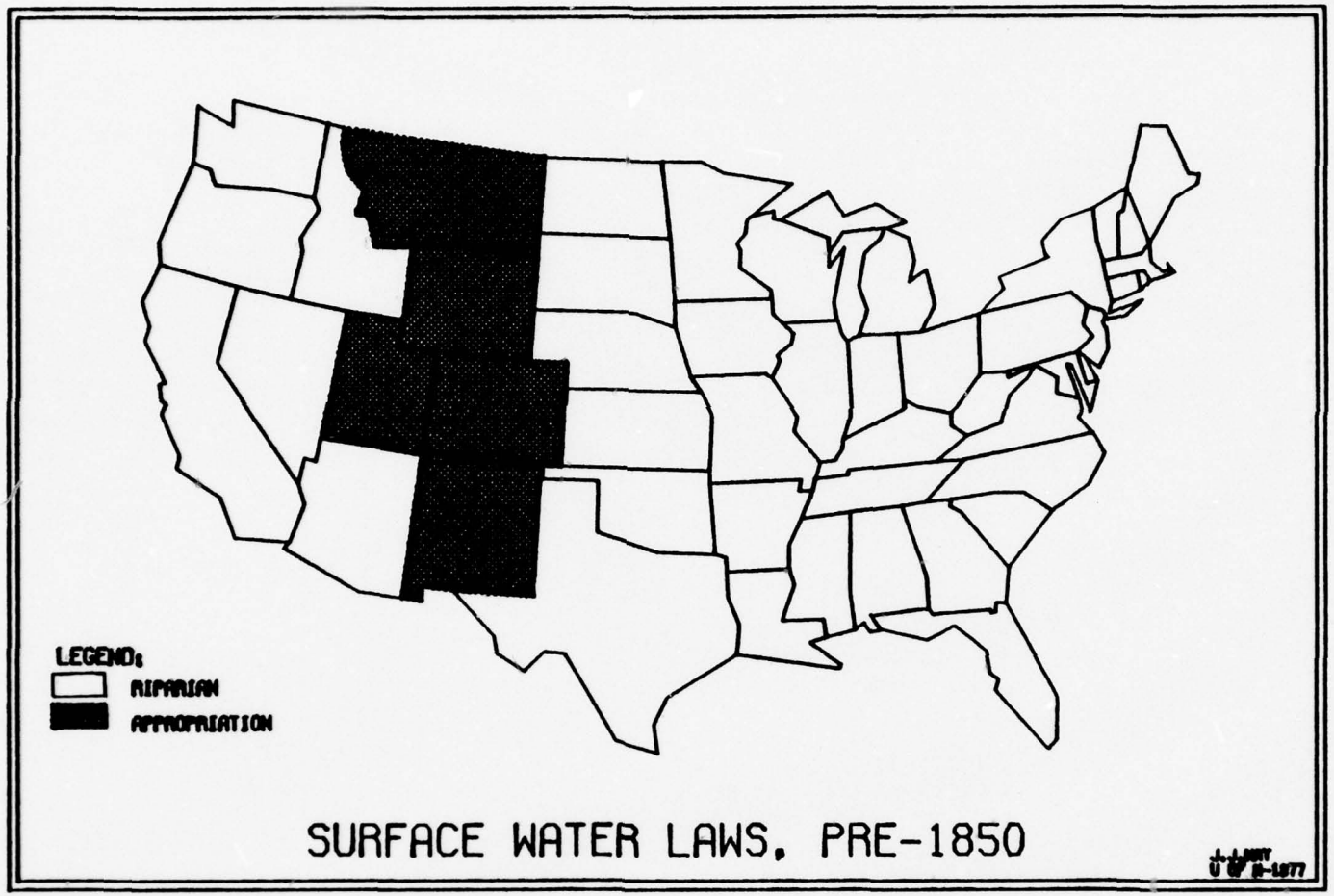

Figure 2.2 -- Surface Water Laws, Pre-1850. Prior to 1850, Montana, Wyoming, Utah, Colorado and New Mexico claimed to have recognized only the appropriation doctrine.

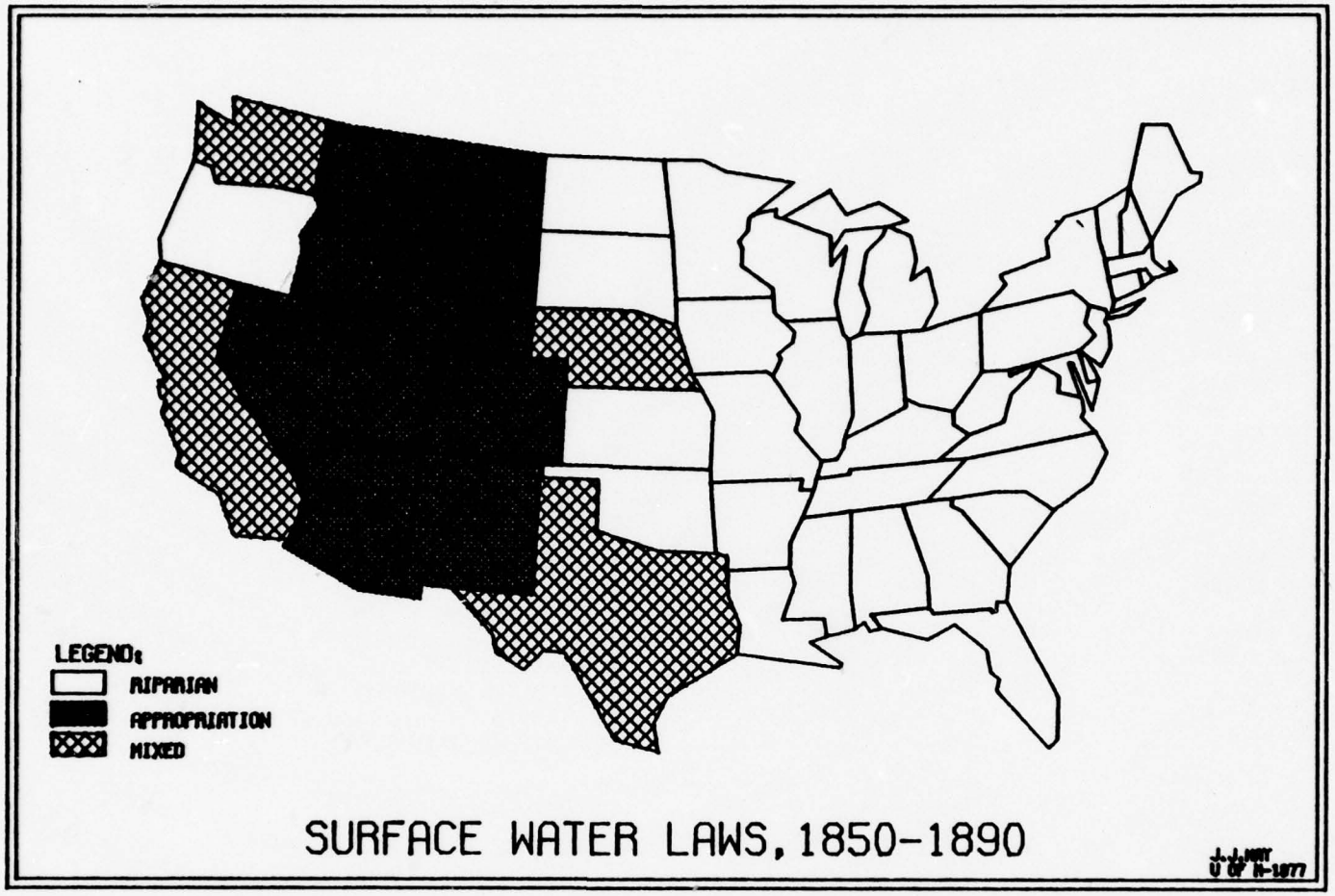

Figure 2.3 -- Surface Water Laws, 1850-1890. During this period Nevada and Idaho adopted the appropriation doctrine as the exclusive method of gaining water rights. Washington, California, Nebraska and Texas chose to recognize both doctrines.

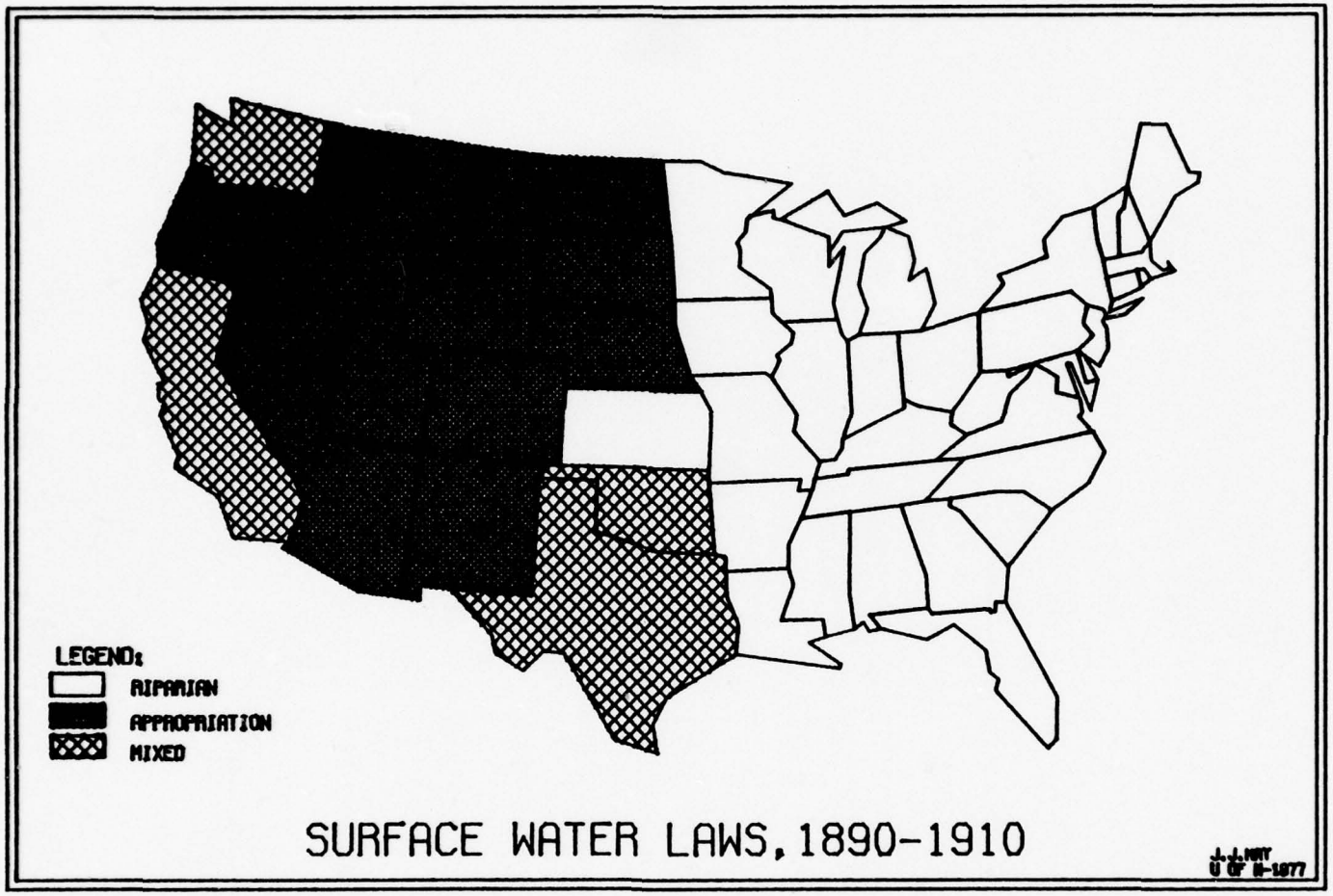

Figure 2.4 -- Surface Water Laws, 1890-1910. At the turn of the century, Oregon, North Dakota and South Dakota became appropriation states. Nebraska changed from mixed to appropriation and Oklahoma decided to recognize appropriative rights.

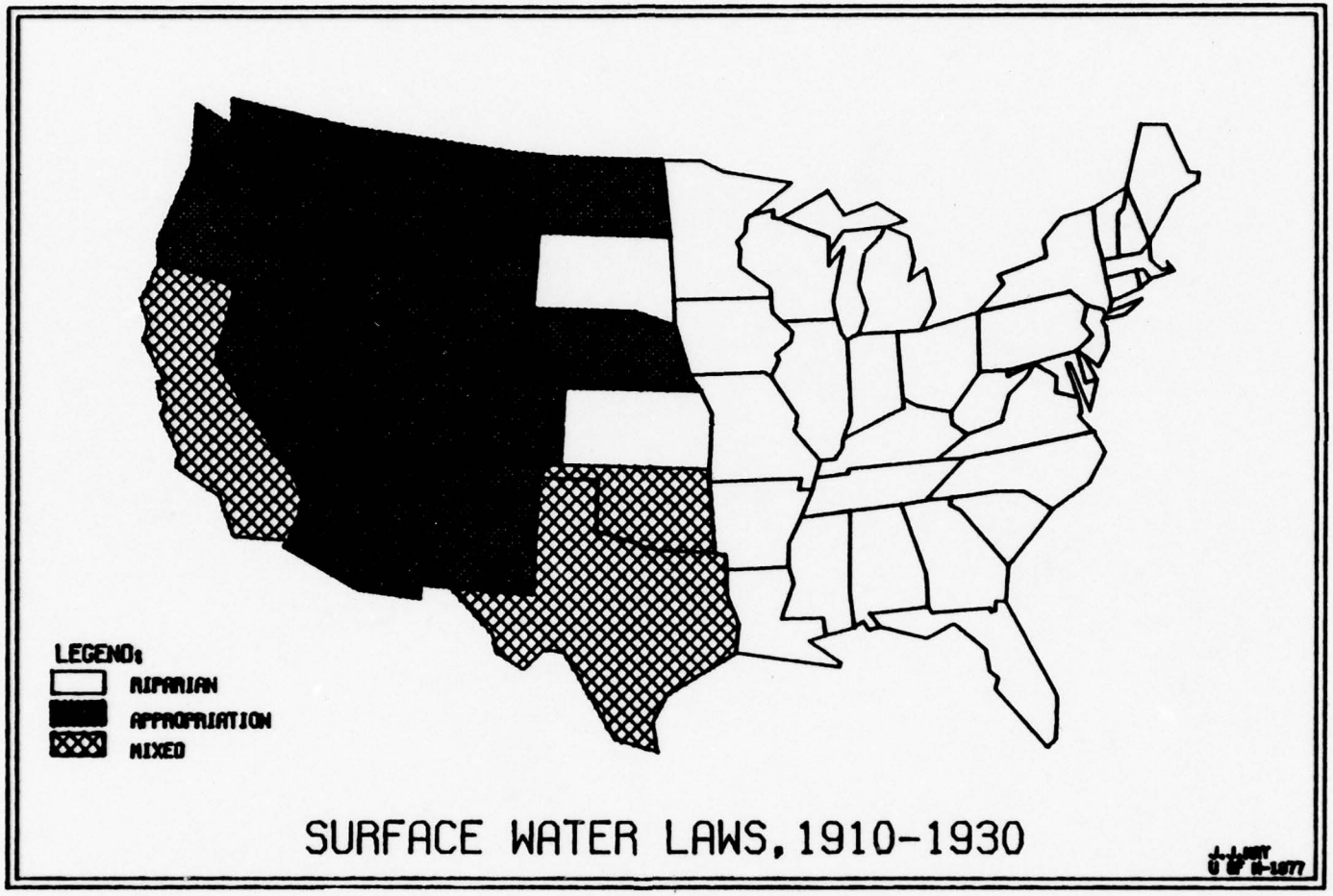

Figure 2.5 -- Surface Water Laws, 1910-1930. During these two decades the South Dakota transition to appropriation was reversed, but Washington adopted the appropriation doctrine while continuing to recognize existing riparian rights.

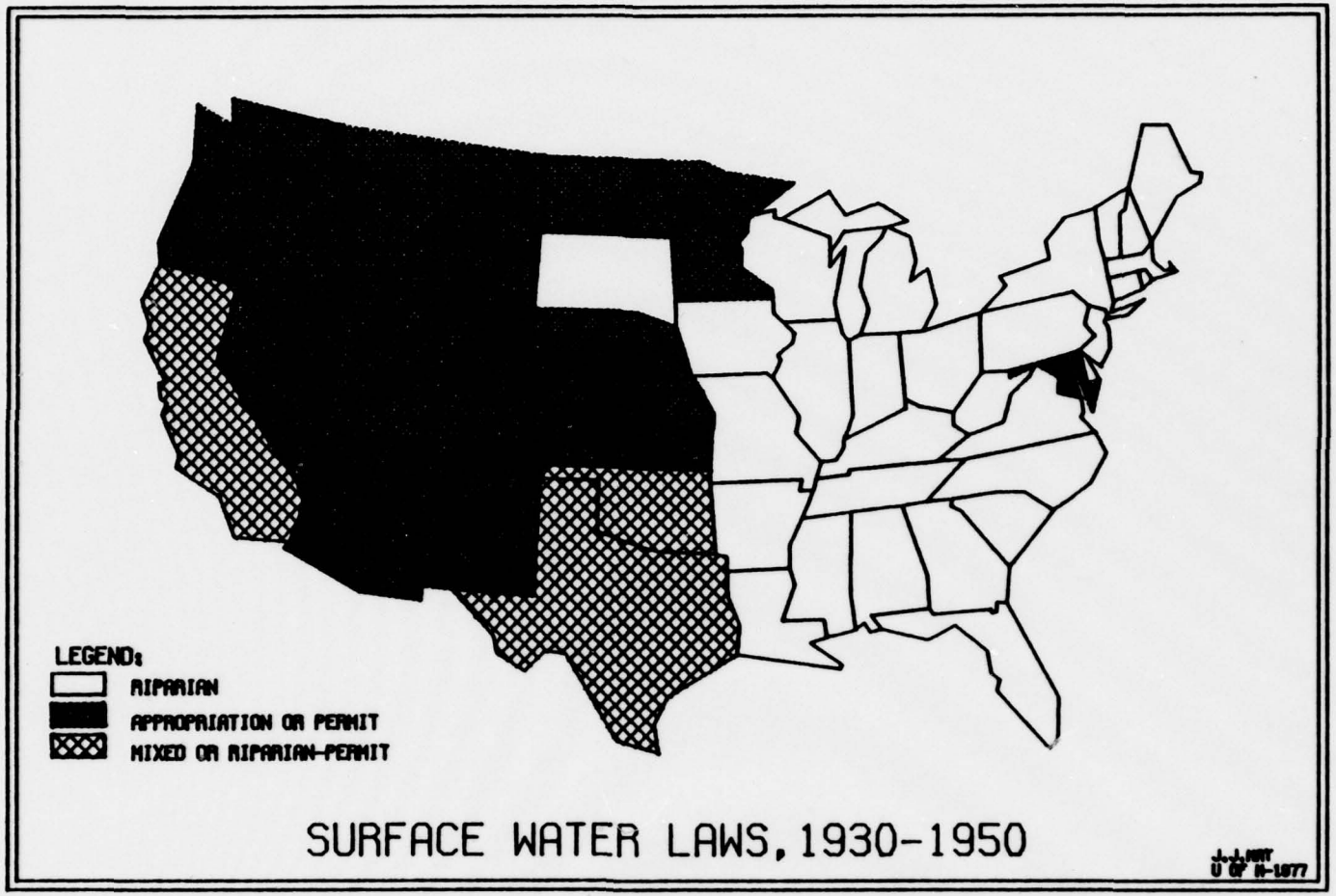

Figure 2.6 -- Surface Water Laws, 1930-1950. Kansas adopted the appropriation doctrine and Minnesota and Maryland established their state laws by using a permit system.

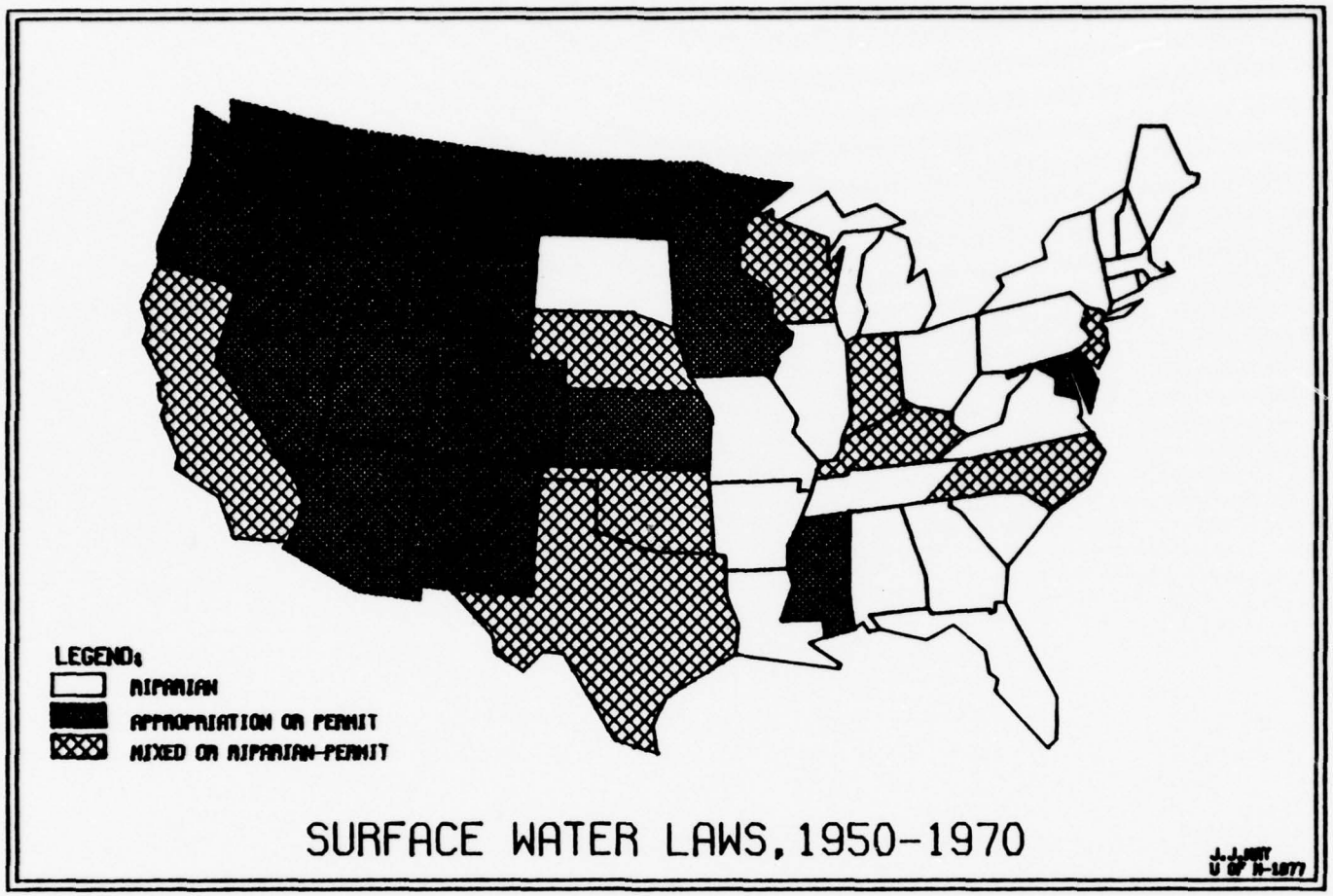

Figure 2.7 -- Surface Water Laws, 1950-1970. Nebraska reverted to a mixed system. Only Mississippi adopted an appropriation doctrine, but Delaware and Iowa adopted exclusive permit systems. Indiana, Kentucky, New Jersey, Wisconsin and North Carolina adopted partial or reparian permit systems.

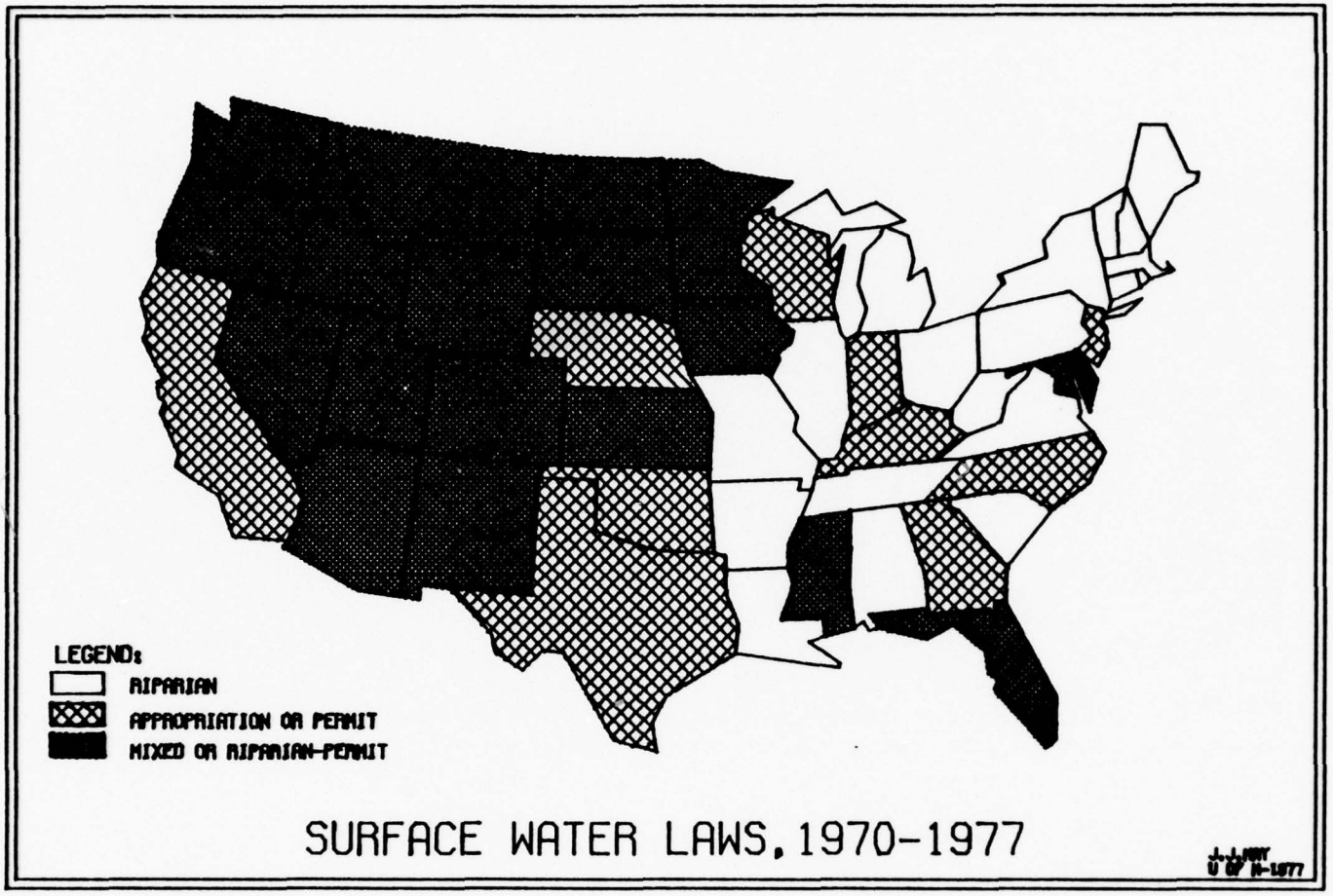

Figure 2.8 -- Surface Water Laws, 1970-1977. South Dakota again became an appropriation state. Florida and Delaware adopted permit systems and Georgia (during 1977) adopted a pertial permit system.

Ground Water

Rights to ground water have traditionally been dealt with in a riparian context. Land owners who had a supply of ground water could use as much as they wanted so long as the use was on riparian land. These underground water resources have not historically been considered an integral component of surface water.[8] However, the two parts, ground and surface water, are part of the same system and it is essential that they be regulated collectively. *Ground water mining* has resulted in the lowering of water tables and in many cases, significant subsidence of the surface elevation has occurred and caused substantial damage.

Many states have dealt with withdrawals in terms of reasonable use, but conflicts in such cases normally occur when an adjacent owner is being damaged by the withdrawal. Administration of such a system is very difficult to regulate effectively and the lack of adequate aquifer surveys complicate the situation tremendously.

Figure 2.9 identifies the ground water laws of each state. Arkansas, California and Hawaii have unique statutes known as *correlative rights*. Most states have ground water statutes identical to their surface water laws.

Appendices B and C identify the specific law of each state.

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[8]Hydrology traditionally treated surface and ground water separately. However, over the past few decades this interrelationship has become clear where landowners have withdrawn so much ground water that river beds have run dry.

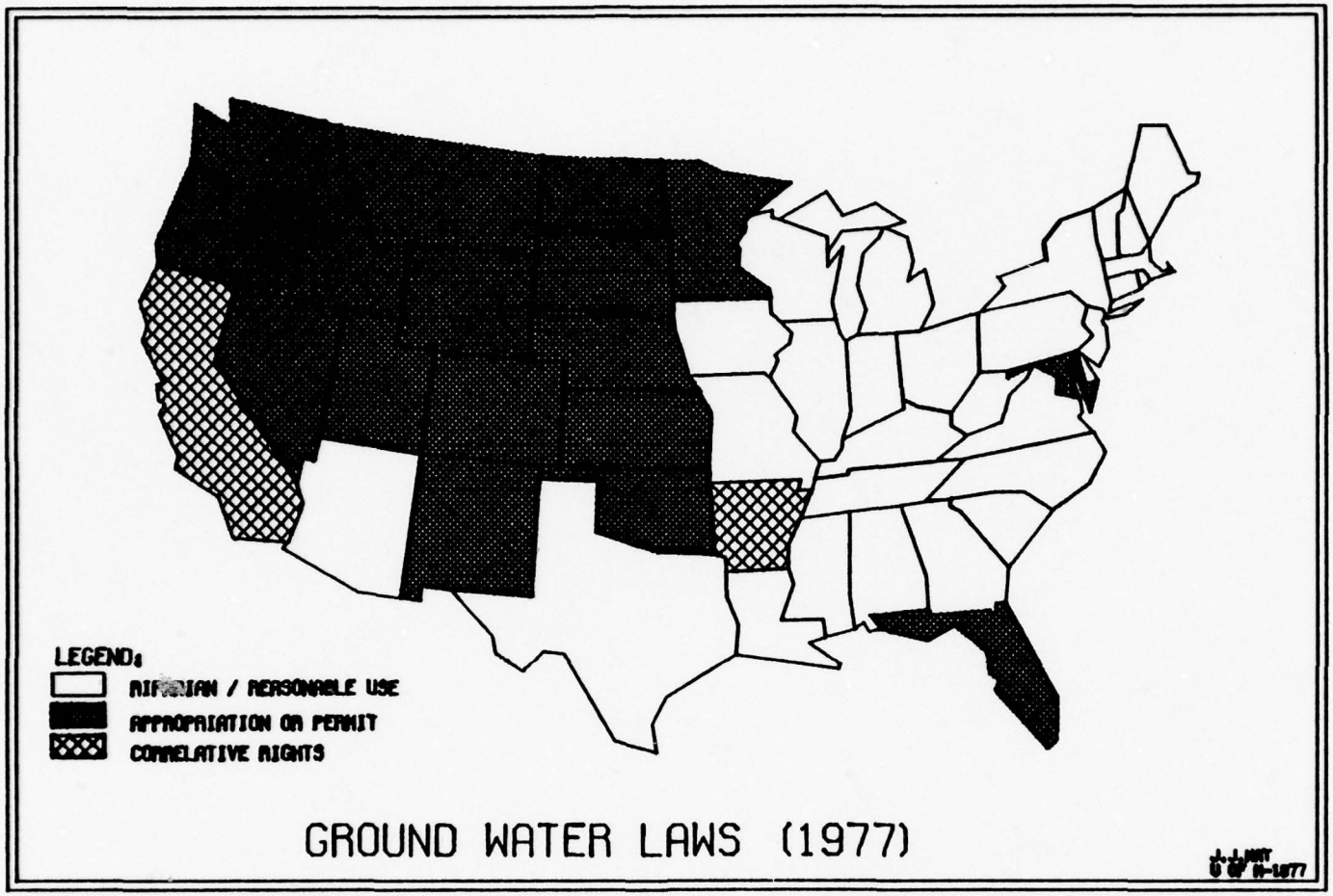

Figure 2.9 -- Ground Water Laws, 1977. Most states adhere to the same ground water rights as govern the surface waters. There are some exceptions; California, Arkansas and Hawaii (not shown) have correlative rights and Arizona has a reasonable use rule.

Indian Water Rights

The doctrine of reserved water rights pertains almost exclusively to the western states and the indian reservations set aside by the Federal Government for the "first Americans". The essence of the legal interpretation of the reserved rights is that the water associated with the land is "reserved" for any and all practical uses of that land (i.e., including future uses). The quantity of such reserved water is not insignificant. In Montana (Winters v. United States, U.S. Supreme Court, 1908, 207 U.S. 564, 28 S. Ct. 207, 52 L. Ed. 340.), the Gros Ventre and Assiniboine tribes halted the construction of dams and reservoirs which would have prevented waters of the Milk River from flowing to the Fort Belknap Indian Reservation. In Arizona v. California (U.S. Supreme Court, 1963, 373 U.S. 546, 595-601, 83 S. Ct. 1468, 10 L. Ed. 2d 542, decree entered 376 U.S. 340, 84 S. Ct. 755, 11 L. Ed. 2d 757.) five indian reservations reserved over one million acre-feet of water; this is more than 30 percent of the water which Arizona withdraws from the Colorado. Reserved rights do not depend upon diversion from a stream; they need not be filed with the state water agency; they are a priority right in time of shortage; they are not lost by non-use and the quantity measured is that necessary to fulfill the purposes of the reservation both at the present time and in the future (Meyers and Tarlock, 1971, pp. 172-173).

Other Significant Trends

Water Rights of the United States

The right to water as exercised by the United States under the classification of *eminent domain* and in accordance with the sovereignty of the individual state is neither an appropriative nor a riparian right. It is simply a superior right ranking first in any chronology of priorities (i.e., It is often subject to both the *5th* and *10th Amendments* to the U.S. Constitution.).

The events of the early 1900's shaped subsequent water resource management policies and decisions. The first of the alterations began in the 1920's when states still believed that their powers were very sacred and that their holdings regarding water resources were untouchable by the Federal Government. These beliefs were shaken whenever the Federal Power Commission (FPC) acted to intervene in a state river and decided to construct a dam. The FPC claims were firmly substantiated in the *Commerce Clause* of the U.S. Constitution which had been viewed very narrowly in the past. It was used in watercourses to define navigability, but now the scope was broadening and becoming more powerful in application. The Clause was chipping away at both the 10th Amendment (States Rights) and the 5th Amendment (Right to Private Property). Citizens witnessed both the rights of their states and their own private property evaporating. This trend of increased Federal power continued through the 1940's as Federal dominance grew more awesome and decisions from the courts even allowed Federal regulation of state "owned" rivers (United States v. Appalachian Power

Company, U.S. Supreme Court, 1940. 311 U.S. 377, 61 S. Ct. 291, 85 L. Ed. 243.). By then, President Roosevelt's New Deal was fully developed and the country was economically evolving out of the Great Depression and the Dust Bowl Days. Federal powers seemed to be, and were, vast. In the case of the First Iowa Hydroelectric Corp. v. F.P.C. (U.S. Supreme Court, 1946. 328 U.S. 152, 66 S. Ct. 906, 90 L. Ed. 1143, reh. denied 328 U.S. 879, 66 S. Ct. 1336, 90 L. Ed. 1647.) conflicts between the states and the Federal Government over the management of water resources was settled. Answers to many of the questions relating to Federal powers were devastating from the states' point of view. Congress expressed its intention to exercise total federal power where necessary. Furthermore, Congress intended to pre-empt and oust state power if conflicts arose. And, though Congress explicitly provided for continuing, coordinate or subordinate power in the states, the Federal Government retained total and complete privilege to authorize and regulate projects in states. The question of navigation was now diluted to the extent that the powers of the Government were defined to be "as broad as the Commerce Clause" itself. The decision of the court was so narrowly interpreted because otherwise states could veto Federal projects and, should the desires of any single state contradict those of the Government, then there was no way to force the state to yield to the supremacy of the Federal Laws. Iowa, then, was indeed the final triumph of the Federal Government in the aspect of governing water rights. But, that decision has not stood alone as rulings in Kansas v. Colorado (U.S. Supreme Court,

1907. 206 U.S. 46, 27 S. Ct. 655) and Arizona v. California (U.S. Supreme Court, 1963. 373 U.S. 546, 83 S. Ct. 1468, 10 L. Ed. 2d 542, decree entered 376 U.S. 340, 84 S. Ct. 755, 11 L. Ed. 2d 757.) show the extent of both the past and present influence of the Federal powers over water projects. (Sax, Water Law 792, lecture notes, Univ. of Mich., fall 1976.)

Project Objectives

Decisions such as those above point out the very complicated problem of approving dams and other water projects where impetus of the decisions is often politically motivated. Political motivation is by no means absent from water project decisions today, but the early rulings were an attempt to separate politics from scientific planning of water resource management. Early reactions to the economic disasters of the late 20's and 30's resulted in *single purpose* water resource projects. Still quite widespread, these projects are often less efficient than their *multi-purpose* counterparts due to designs that prohibit additional uses and added efficiency. Such supplementary uses can normally be added at a small fraction of the project cost and produce substantial benefits. Tremendous undertakings such as the Tennessee Valley Authority (TVA) were looked at as multi-purpose. But even projects like the Central Arizona Project (CAP), which began as a multi-purpose project, have given way to the systematic approach of *multi-objective* water resource planning. This methodology incorporates many systems considerations (ecologic,

hydrologic, geographic, economic, social and human) into the final planning process.

Concern for the Environment

Environmental concerns (a term as broad as multi-objective) also began to take shape in the mid-1960's.

> A review of current efforts to manage water to serve the needs and desires of man reveals that all aspects of water management would be improved by planning that would maintain flexibility for the future, foreclose as few choices as practicable, and put fresh demands on science to predict consequences and to provide alternatives to meet changing needs. Specifically, such an emphasis would call for applying more intensively present knowledge of the behavior of water, land, and man in two ways: first, by identifying all available alternatives for coping with water problems and taking systematic steps to discover new alternatives; and second, by improving methods of recognizing the social as well as the physical consequences of water management and of weighing alternatives. (Senate Document No. 97, 1966, p. 48.)

The requirements of "in stream" uses of water began to surface even earlier. In 1952, the Wisconsin Court heard the conflict of Muench v. Public Service Commission (261, Wisc. 492, 53 N.W. 2d 514, 519). The result of the decision in this riparian state was the recognition of a public right to the flow of the Namekagan River, consequently, the abolition of some private property rights. This was a shift from the concept of private ownership toward the concept of public ownership (which, in contradiction, was part of the appropriation doctrine). The move from the traditional private system to the more public system was not limited to the above use. Nekoosa-Edwards Paper Company v. Public Service Commission (Supreme Court of Wisconsin,

1959. 8 Wis. 2d 582, 99 N.W. 2d 821.) was yet another Wisconsin ruling where conservation of public rights to fish and enjoy the stream in its natural state influenced the courts' interpretation of private ownership.

At the turn of the century in the west, appropriators were claiming that old appropriations were wasteful and that instream uses did not comply with the provisions of the appropriation doctrine. The claim was that the appropriation doctrine was designed to promote economic development, and that it required diversion of water to establish an economic use (Empire Water and Power Company v. Cascade Town Company, 205 Fed. 123, Eighth Circ., Colo. 1913). In the Cascade case, the construction of a water and power plant was awarded the superior right to divert water. The town, which had developed as a resort whose foundation was the Cascade Waterfall, was declared a wasteful user. Even this aspect of appropriation was to give way over the years as Colorado, Utah and Montana enacted new legislation to distinguish the need for preserving the public's right to appropriate water for the protection of the esthetic beauty and wildlife habitats of streams.[9]

More recent trends seem to indicate a growing desire of citizens to impose themselves back into the issues of social concern (e.g., the environment). Projects such as the Central Arizona Project have

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[9] Colorado River Water Conservation District v. Rocky Mountain Power Company, Supreme Court of Colorado, 1965; and various state codes--Revised Code of Montana 26-1501 thru 1507, dated 1947 and Utah Code Annual, section 73-6-1, dated 1953, permit appropriations by "public" state agencies, but not by private conservation groups.

become the "solution" to a multitude of water problems which face the southwest. As the cost of water being purchased from private owners rose, the desire of the southwest to abandon agriculture for industrialization led to federal subsidies for water projects such as CAP. The outcome has been increased Federal "welfare" payments to support these projects at the expense of the general public.[10]

Nonetheless, the need for some regulatory controls on water uses are essential to our nation's survival. Water is unique and it apparently requires equally unique consideration based on geographic and environmental attributes.

In 1966, Congressman James Wright expressed the following observations:

> "Water is life itself, and in too many places it is vanishing from our midst....Within a very few years, every major section of the country will have water troubles of one type or another....The water famine (reference is made to the east coast drought of the mid-60's) is caused by people in our advancing industrial society....We have been growing too rapidly to keep pace in the development of our resources, and we have been too preoccupied with growth to think about conservation." (Wright, The Coming Water Famine, 1966.)

Today and Tomorrow

It has been the experience of the eastern states that outright abolition of traditional riparian rights is emotionally, thus

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[10]That is until February, 1977, when President Carter "redistributed" the remaining funds of the CAP, and other projects, identifying them as environmentally unsound and unbalanced in their provision of "national" benefits. The end result of his action, however, has not yet been observed.

politically, unacceptable. But, the 1930's witnessed an innovation in the history of water rights, the permit system. Chapter 4 will discuss some of the detailed aspects of each system.

The Water Resources Act of 1965 (P. L. 89-80, July 22, 1965, 79 Stat. 249, 42 USCA 1962b-4.) established planning agencies in each of the Nation's major river basins. This step to provide adequate management guidelines for developing the many aspects of water resources is essential. Regional basin commissions have been assigned the task of establishing comprehensive, coordinated, joint plans for water and related land resources development. The emphasis on such interrelated planning is critical to the water management field and represents a significant breakthrough. This effort should continue and might be viewed as the current tenor of public feelings toward conscientious administration of public goods.

Nevertheless, the trend toward greater practical control over state water resources continues as riparian states find the permit system to be a reasonable substitute for appropriation doctrine in terms of water regulation.

> "Since World War II, changes in agricultural patterns, industrial growth, urbanization, and leisure time demands for water-based recreation have combined to exert unprecedented pressures on relatively inelastic water supplies. Nowhere has the threat of water scarcity been more traumatic than in the eastern United States, where for centuries bountiful rainfalls fostered a myth of unlimited water supply. Already episodes of serious local scarcity have occurred, and water use projections make evident the need for enlightened water resource management if widespread water use conflicts are to be avoided. (Davis, 1971, p. 1.)

The following chapter serves as an example of the potential for conflicts over water withdrawal, conflicts not unlike those experienced during and since the times of the early pioneers. America's southeastern states have existed with the impression of abundant water resources for centuries. Recent growth trends may prove this to be false security and impose greater demands for reformed methods of resolving the conflicts and improved planning for this valuable resource.

CHAPTER 3

Water Conflict -- A New Concern for the South

The previous chapters provided some background to the circumstances which existed in the United States causing various degrees of change in water rights laws. Physical and social pressures on water supply play a tremendous part in the formulation of these laws.

This chapter will demonstrate the influence of the components of physical limitations and social requirements on water supply in the southeast where population and industry are growing rapidly, and where the potential for increased agricultural production may soon become reality. This region, known as the "southeastern sunbelt," was delineated geographically in Chapter 1 (see fig. 1.4). The region is representative of several unique characteristics in the United States.

1. Taken as a region,[1] the average annual precipitation exceeds 50 inches.[2] This is the highest average of any region in the U.S.
2. Several of the states continue to maintain (adhere to) the riparian doctrine (see figs. 2.8 and 2.9).
3. A large portion of the rainfall runoff flows directly and often quickly to either the Atlantic Ocean or the Gulf of Mexico where it cannot be used for many of man's purposes.

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[1]The region includes the states of Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana, Arkansas and Tennessee.

[2]This is the simple average of the individual states annual averages for a 40 year period. (National Oceanographic and Atmospheric Administration, 1970.)

4. The rapid growth in many of the southeastern states will place substantial demands on water supply.
5. As can be seen in figures 2.7 and 2.8, several of the southeastern states have "recently" (i.e. since 1950) adopted water laws intended to improve the regulation and control of their water resources.

The indication herein emphasized is that, should the growth trend continue, each of the southeastern states will, out of necessity, alter their water rights laws. Thus, the trend toward regulation and control, as emphasized in Chapter 2, will continue into all of the southeastern states.

Historically, the western states anticipated their needs for water rights legislation and adopted innovative procedures for acquiring these rights. Needs not unlike those in the west are presently evolving in the southeastern states. Conflicts over water rights are certain to erupt as vastly different uses of water fail to comply with existing, traditional methods of allocation.[3]

The need for the remaining southeastern states[4] to make individual changes to their water laws is an urgent one. The effort herein is to prohibit any *foreclosure on future alternatives* to water resource acquisition by adopting laws which protect both

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[3]Conflicts between riparian owners and new production interests are sure to arise as the existing riparian laws forbid many of the economically efficient uses of the water resource (see Chapter 4).

[4]Virginia, South Carolina, Alabama, Louisiana, Arkansas and Tennessee.

private and public water rights while allowing controlled, and if need be, restrained growth in economic areas. The problem involves the adaptation and adoption of a water rights system which is sufficiently flexible so that it can be adapted to individual state needs, yet restrictive in its intention to regulate and allocate the water resources of the state.

The Changing South

Over the last two decades the south[5] has become a thriving, forward looking, enthusiastic region. Indeed, the notion of the mid-twentieth century apathetic and backward south, as often perpetuated by the north, is being reoriented. There is substantial recognition of the south as a dynamically growing region in terms of culture, industry, population, agriculture and politics.[6]

Indications of this growth will be developed in subsequent sections of this chapter, but the link of this growth to the question of water resource management exhumes a very old and much discussed topic. One often asks "... did the availability of water draw the people to it or did the people move where they pleased and subsequently divert the water to their new location?" The Tennessee Valley Authority drew people to it both for work, initially, and later for adequacy of power supply for production in a now

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[5]Henceforth, the "south" will indicate the same region as the "southeast."

[6]Sale, 1975; Guillory, 1973; Nordheimer, 1974; and Zelinsky, 1974 all speak of the progressive nature of the south.

heavily concentrated area of U.S. industrialization. In Arizona quite another phenomenon has occurred. The population increase of Arizona established it as the fastest growing state with a 26 percent growth rate since 1970 (U.S. Bureau of the Census, 9 January 1977); yet, less than an average fourteen (14) inches of precipitation fall in Arizona annually. For the most part Arizona's water supply problems are of tremendous import as depletion of existing supplies continue[7] (Arizona Water Commission, July 1975, pp. 7-14).

The south, as described in the introduction, is characterized by an abundance of rainfall and, except for the possibility of some dry summer months, is humid year round (see figures 1.2 and 1.3). This availability of rainfall makes the value of the water in the south much less significant when compared to that of the southwest. One could argue the point that the uses of the humid southern states is "wasteful" compared to southwestern standards. However, this analysis does not really involve comparisons between the south and southwest.

As one looks at the quantities of available water found in table 3.1, there does not appear to be any reason for concern over water shortages in the south. However, the concern over water shortage is not the problem either. The problem is one of control, regulation, and allocation of water resources. The concern involves

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[7]Much of Arizona's water comes from ground water sources. Currently more is being withdrawn than is being replaced by nature.

two concepts, *withdrawal*, or the removal of water with the intention of returning the major portion, and *consumption* or the removal of water with no intention of returning any significant quantity.[8]

Table 3.1 identifies current and projected water uses in the United States developed according to *drainage basins*. These basins are identified in figure 3.1.

Quantities expressed in Table 3.1 suggest that existing demand does not exceed supply in the southern basins (identified by italics) and that there is even some room for expansion of uses for the future. However, close analysis may indicate that withdrawals in those states within the South Atlantic-Gulf Basin (the area with the dominant number of southern states) are expected to reach 44 percent of the total supply by the year 2000 and 66 percent by the year 2020.[9]

The concept of withdrawal is a peculiar one. For example, let us say that a power plant withdraws water for cooling purposes and returns nearly all of it. Should there be an increase in the number of plants the quantity of withdrawn water will of course increase, perhaps to some *critical flow levels* locally.[10] There are normally requirements that stipulate the temperature at which

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[8]Nearly every water withdrawal or use "consumes" some water; often the amount is very small but in many instances (agriculture) the quantity consumed may be sizeable.

[9]It is essential to emphasize here, that all of the projections made to date were made prior to or as a result of the 1970 census. This point is critical to the rest of this chapter, for as will be shown, growth, and the consequent demands for withdrawals of water have exceeded 1970 expectations.

[10]"Critical" is a term which varies from one locale to another. It often means a level or amount of flow, but may take on other connotations (see Glossary, Appendix A).

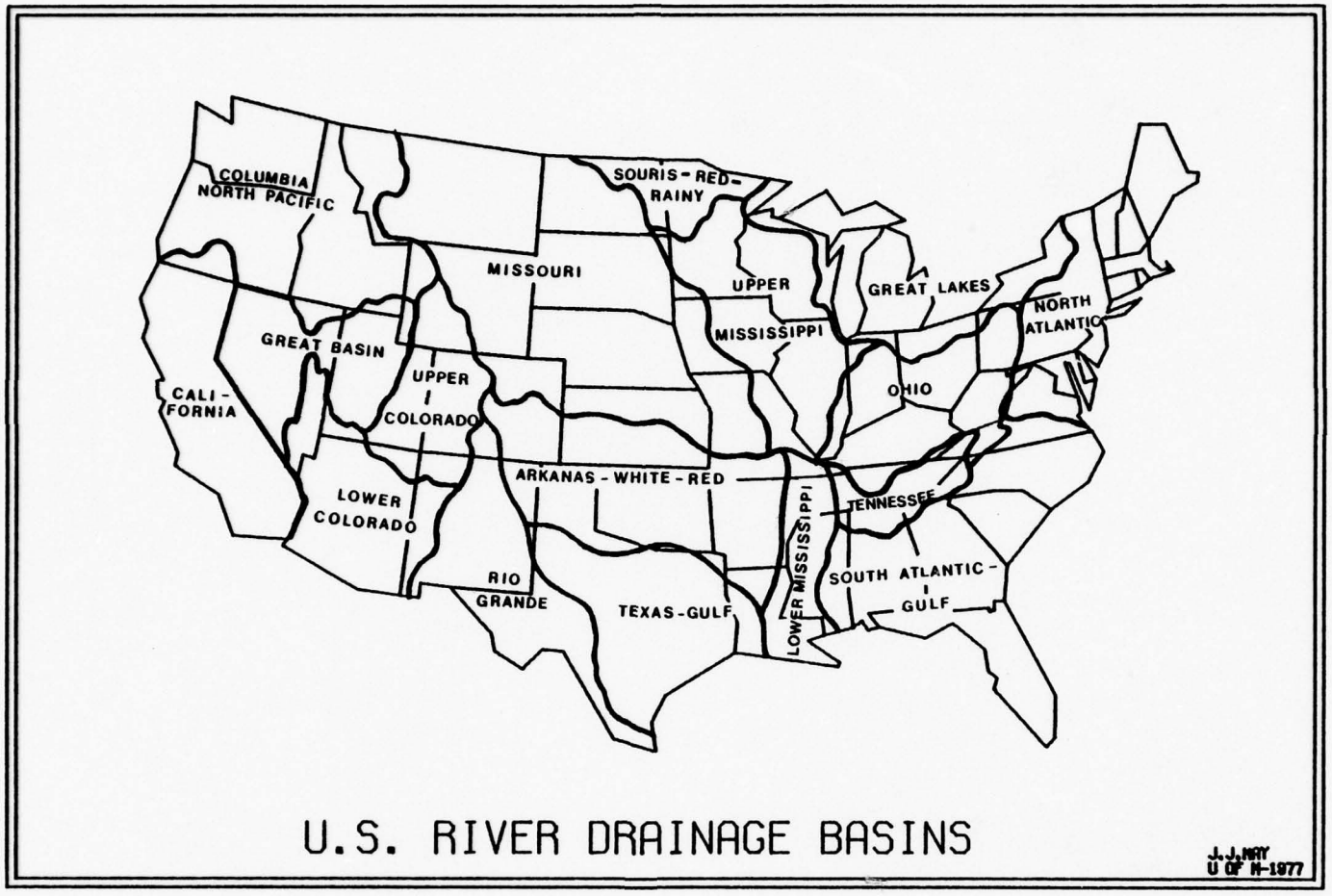

Figure 3.1 -- U.S. River Drainage Basins. There are 17 major basins as shown above.

Table 3.1 -- Current and Projected Water Uses (1970-2020), Withdrawals/Consumption (values in billions of gallons per day)

Basins	Available Supply (Mean Annual Runoff)	Percent 1970	Percent 2000	Percent 2020
Columbia-North Pac.	210	26.2/.8	44.2/2.9	66.0/4.2
California	65.1	73.7/33.8	185/50.2	376/58.7
Great Basin	5.9	114/50	129/60	132/60
Lower Colorado	3.2	226/157	263/144	279/166
Upper Colorado	13.45	60/30.5	49/23	50/23
Rio Grande	4.9	128/67	194/102	239/112
Missouri	54.1	44.4/22.2	51.6/27.7	58.4/30.3
Arkansas-White-Red	95.8	12.5/7.1	26.4/11.1	33.0/12.8
Texas-Gulf	39.1	53.7/15.8	146/27.9	237/31.5
Souris-Red-Rainy	6.2	4.8/1.1	32.2/8.0	45.2/8.0
Upper Mississippi	64.6	24.8/1.2	47.4/2.7	63.9/4.0
Lower Mississippi	48.4	26.9/7.4	57.8/9.3	81.4/13.0
Great Lakes	63.2	61.7/1.9	152/5.1	302/8.7
Ohio	125	28.8/.7	52.1/2.0	72.0/2.9
Tennessee	41.5	19.0/.5	33.5/1.9	43.6/2.6
North Atlantic	163	33.7/1.1	69.9/3.1	145/5.2
South Atlantic-Gulf	197	17.8/1.7	44.4/2.3	66.1/4.2

Values derived from U.S. Water Resources Council, 1968; Murray and Reeves, 1972; Geraghty, Miller, van der Leeden and Troise, 1973, plates 23 and 86; Meyers and Tarlock, 1971, pp. 34-35 and Wollman and Bonem, 1971. Mean annual runoff values in the first column represent the available supply of surface water available daily, divided into the 1970 and projected withdrawal and consumption values yielded the above percentage figures. Underlined values represent withdrawals and/or consumption which is in excess of daily supply. This is possible through ground water withdrawals which have been stored over the years or it may represent use of some runoff from upstream basins. Basins in italics are those which supply the south.

the cooling water may be returned to the stream flow. Large holding ponds are normally provided. The water withdrawn and withheld may be crucial to a riparian owner downstream who may not have any recourse against a power company that does not "consume" more than an insignificant quantity, yet withdraws large sums.[11]

Other examples of withdrawal for agricultural, industrial and domestic uses are numerous and, with increased withdrawals comes a greater urgency for regulation.

Is There a Problem?

Further analysis of table 3.1 shows that the southern withdrawal and consumption of water, as projected in the early 1970's[12] for the year 2000 is not nearly as critical as the problem in the southwest (Great Basin, Rio Grande and California Basins). The underlined values indicate substantial ground water mining which means withdrawal in excess of annual supplies.

The western states were not dealing with a 44 percent withdrawal of water when they decided to adopt the appropriation doctrine. Yet, the doctrine was adopted because the people saw the need for regulating a scarce resource.

The southern states face no significant problems with water supply today, at least not in terms of availability of water. Nevertheless, as the west developed laws to provide for future

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[11]While the riparian laws do protect owners, one can easily see the conflict which can evolve of the "efficient" use of the water.

[12]See note 9, this chapter.

growth in many economic and social areas, so must the south. Economic, demographic growth in the south is exponential, as will be shown in the following pages. The following analysis will indicate the magnitude of this growth over only a short span of years.

Population.

The results of the 1970 census indicated that north central and northeastern states (see figure 1.1) had eight million more residents than the south and west. Census Bureau estimates as of July 1, 1976 show the south and west with a population of 107,418,000 as compared to the north's population of 107,242,000. The parity of these figures obscures the 8 million person population differential which existed only six years prior.

This increasing growth reinforced earlier Census Bureau regional trend projections. For example, of the estimated 1.6 million increase in population, between 1975 and 1976, less than 9.4 percent (150,000) occurred in northern states, while during the same period 50 percent (800,000) of the growth was in the south and greater than 40 percent (660,000) occurred in the west (Census Bureau News Release, 9 January 1977, Appendix E). The Census Bureau further indicates that between April 1, 1970 and July 1, 1976, the net migration to the south was as shown in Table 3.2.

Table 3.2 -- Net Migration Data (1970-1976)

Region*	Number	Percent
New England	59,000	.5
Middle Atlantic	-851,000	-2.3
East North Central	-1,060,000	-2.6
West North Central	-78,000	-.5
South Atlantic	1,970,000	6.4
East South Central	235,000	1.8
West South Central**	734,000	3.8

*Region component states are identified in Appendix E.

**Of the west south central states, only Louisiana shows a negative migration (or outmigration) of -.6 percent.
(Source: U.S. Census Bureau, Appendix E.)

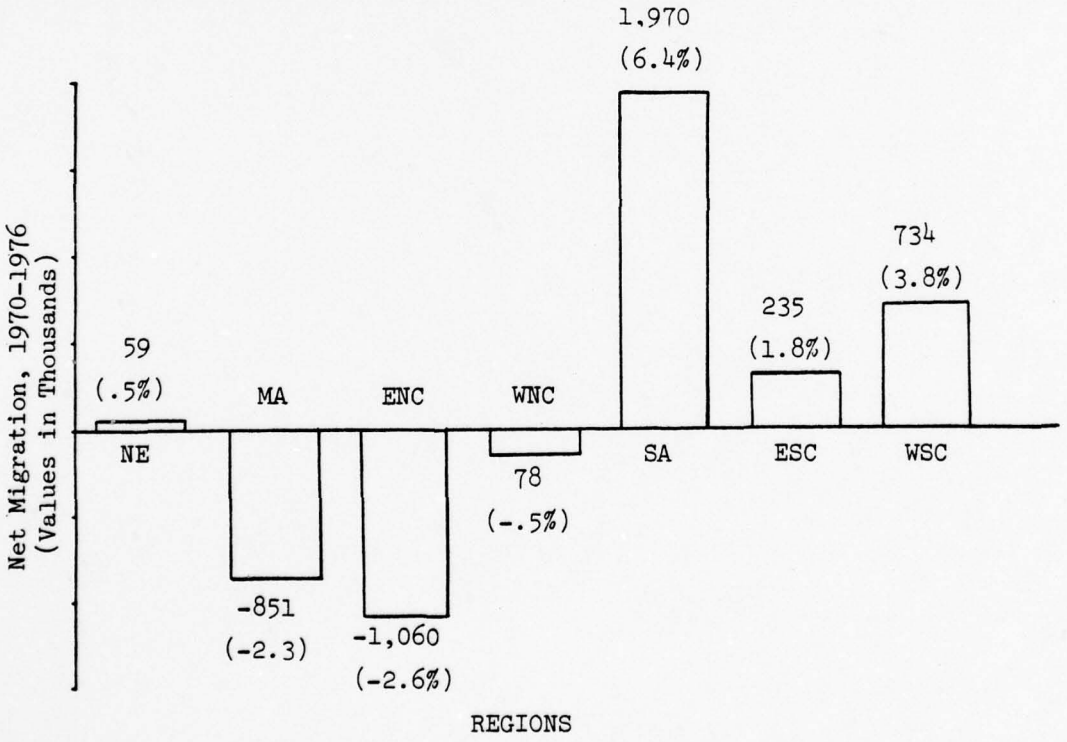

Figure 3.2 -- Net Migration, 1970-1976. New England (NE), Middle Atlantic (MA), East North Central (ENC), West North Central (WNC), South Atlantic (SA), East South Central (ESC), West South Central (WSC). Values based on U.S. Census Bureau Data (Appendix E). Note large growth in South Atlantic States.

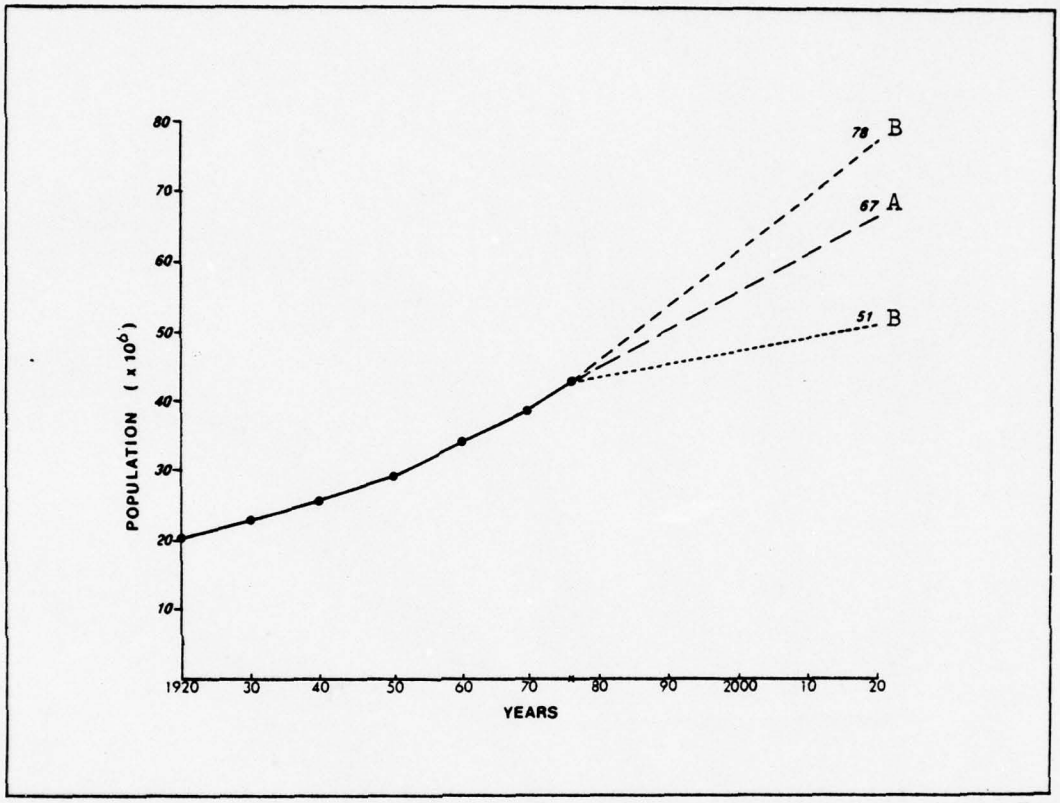

Figure 3.3 -- Southeastern Population Growth (1920-2020). (Values based on statistics in Appendix F.) Projections are by the U.S. Census Bureau, Department of Commerce, 1976 (identified by the letter A) and by the Bureau of Economic Analysis, Department of Commerce, 1976 (identified by the letters B). The range of values shown indicate the Census Bureau's 1972 "Series E" national population projections -- birthrate of 2.1 -- and the Bureau of Economic Analysis' alternative regional disaggregations thereof as published by each state. The alternative projections rely on data through 1975.

Figure 3.2 is a graphic representation of the migration values taken from the Census Bureau statistics shown in table 3.2. Table 3.2 and figure 3.2 are indications of the growth trend as both predicted and as is now being experienced in the sunbelt. While the northeast and north central regions are undergoing population increases of .9 and 2.0 percent respectively, the south and western populations are booming with respective growths of 9.6 and 10.7 percent (Census Bureau, 9 January 1977, Appendix E). Based on the average growth rate in each southern state, 1970 to 1976, should such a trend continue, the population of the south will have grown from 38,814,300 in 1970 to 67,108,000 in the year 2020. This represents a 73 percent increase over the 1970 population of the south. Figure 3.3 shows the population growth trend from past decades and projects the growth through the year 2020.

The 67 million population projection for the year 2020 is based on U.S. Census Bureau forecasts. Should the population growth reach the high estimates, as many as 78 million people may live in the south by 2020. This growth alone will put substantial pressures on water resources. Indeed, Wollman and Bonem (1971, p. 21) indicate that should the high population growth occur in the south, requirements for water will demand daily withdrawals of large proportions actually in

excess of available daily supply.[13] Meyers and Tarlock (1971, p. 31) estimate that water use will rise from 20.56 billion gallons withdrawn in 1965 to 130.2 billion gallons in 2020. The estimate for the year 2020 represents 70 percent of the 186 billion gallons available daily. Thus, considerable urgency is needed to enforce allocation of water withdrawals in the near future.

Industry (Foreign and Domestic).

Industrial indicators show only positive growth trends in the southern states. Both U.S. and foreign firms are accounting for more jobs in the sunbelt. U.S. Department of Commerce statistics estimate an increase of 12 million new jobs by 2020.[14] Everything from amusements and tourism to textiles and chemicals are being produced by southern businesses. "Between 1970 and 1976 corporate or regional headquarters of 55 domestic and foreign companies moved to Georgia. An estimated 450 companies shifted headquarters or major divisions to Tennessee during the same period." (USN&WR, August 2, 1976, p. 45).

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[13] This evaluation is based on many chemical and water treatment parameters (BOD, DO and sewage treatment processes) which require substantial time and quantities of water themselves, to make domestic supply suitable for use. Of the 186,030 billion gallons available per day, a high population growth (see fig. 3.3) will require 186,781 billion gallons daily. Indeed, say the authors, "by 2020 only six regions: New England, Ohio, Upper Mississippi, Lower Mississippi and the Arkansas-White-Red Basins, will have adequate supplies."

[14] This estimate was compiled from projections of the U.S. Department of Commerce, Bureau of Economic Analysis (October, 1976) and the Southeast Basins Interagency Committee (August, 1976, revised).

Fortune Magazine periodically lists the 500 largest U.S. corporations and their headquarter's location. Based on a comparison between the listings of July 1965 and May 1976 the number of southern based corporations grew from 46 to 78. Some of the corporations moved (e.g. Liggett and Meyers and Simmons Corporations both moved from New York headquarters to North Carolina and Georgia respectively) and others were new companies (e.g. Savannah Foods and Industries). Some of the companies will have large needs for water, others smaller requirements. Semple (1973) analyzed this characteristic of industrial moves to the south as a "diversification" of corporate headquarters, "a redirection away from spatial concentration." But the primary point to be made here is the continual increases in demands for water that these industries will make.

There seems to be a great deal of interstate competition for businesses. Southern states actively seeking growth offer tremendous incentives to corporations to visit and establish plants in their states (e.g. tax incentives, preferential site locations, etc.). Trips to the north by state governors (e.g. Louisiana, Mississippi and South Carolina) are intended to entice industries to their states. Invitations of the states are extended to corporate executives to visit and discuss the opportunities; these trips are often provided entirely at the expense of the states involved, include jet plane and limousine transportation as well as complete freedom to site plans.

"Frank White, executive director of the Arkansas industrial development commission explains, 'the thrust of industrial development

in the south is not to build enormous plants, but to locate in rural areas where you can employ 200 to 400...'"[15] (USN&WR, 2 August, 1976, p. 45). This aspect alone makes water resource planning difficult. Without comprehensive state water rights legislation, large corporations with significant political backup from the state can cause substantial hardships.[16]

U.S. companies are not the only ones who see the south as a lucrative siting alternative for new industrial manufacturing plants. Hundreds of foreign manufacturers such as Britain's Imperial Chemical Industries, Ltd.; West Germany's Hoechst AG, Michelin, Hergeth KG; Japan's Sony and Italian and French concerns are moving to the American southern states of North and South Carolina, Louisiana, Georgia, and Alabama. Their reasons for moving vary from current trade agreements to domestic political and economic uncertainties. Robert B. Cullen of the Associated Press (Ann Arbor News, Sept. 5, 1976, p. 46) reports that, "...as of 1974, $7.5 billion dollars of the national total of 19 billion in foreign industrial property was located in 15 sunbelt states: Southern California, Arizona, New Mexico, Oklahoma, Texas, Arkansas, Louisiana, Mississippi, Tennessee, Alabama, Florida, Georgia, North and South Carolina and Virginia. And of that $7.5 billion, $6 billion was in Dixie, the southern states east of Texas."

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[15] Even increases of 200 to 400 employees (with families of 3), place an additional 800 to 1600 person tax on all available services, including water supply and wastewater treatment.

[16] Assurances of adequate water for processing (textiles, chemicals, etc.) are bound to be part of the inducements for industrial moves to the south. Diminution of private rights and excessive pollution can result.

Mr. Cullen cites General Accounting Office figures stating that, "...foreign manufacturers have brought 19,750 direct new jobs to South Carolina alone. This figure represents 5.5 percent of total manufacturing employment in South Carolina, more than 40,000 new residents, about $70 million in new retail sales and between $122 and $172 million in additional personal income." Cullen further quotes George Dean Johnson, Jr., chairman of the South Carolina State Development Board, as saying, "Before this industrial influx our people were chronically underemployed. This (influx) has stopped outmigration and substituted a migration into the state."

Agriculture.

The available land in southern states is predominantly agricultural. As previously stated, most of the industrial site locations are somewhat remote rural "settlements" with several hundred employees. This characteristic is somewhat novel, but may well be the result of local or state water right statutes. Unwilling to risk investment where water supply for either domestic or industrial uses may be eliminated by conflicting riparian claims, the sites are selected where the conflict may be minimal. Price of land is also important, but there is little doubt that water availability is one of the significant factors in the selection of industrial sites.

Based on soil types, the U.S. Soil Conservation Service evaluates southern farmland as "potentially" some of the most fertile land in the country (A.W. Küchler, University of Kansas; National Cooperative

Soil Survey, 1967; Soil Conservation Service, 1967, as found in the National Atlas, Plates 85-91, 1970).

The agricultural use of water is by far the most consumptive. Thus, with a 50 percent increase (2,309,000 acres in 1975 to an estimated 3,459,600 acres in 2020) in irrigated land projected for 2020, the resultant withdrawal and consumption of water will also rise drastically (Southeast Basins Inter-Agency Committee, August 1976, revised, pp. 311-349).

Economic indicators represent positive movement in almost every category. Figure 3.4 indicates six key measures of the pace of growth in the south as determined by the U.S. Departments of Commerce and Labor; Bureau of the Census and Federal Deposit Insurance Corporation (as cited by U.S. News and World Report, 2 August 1976, p. 47).

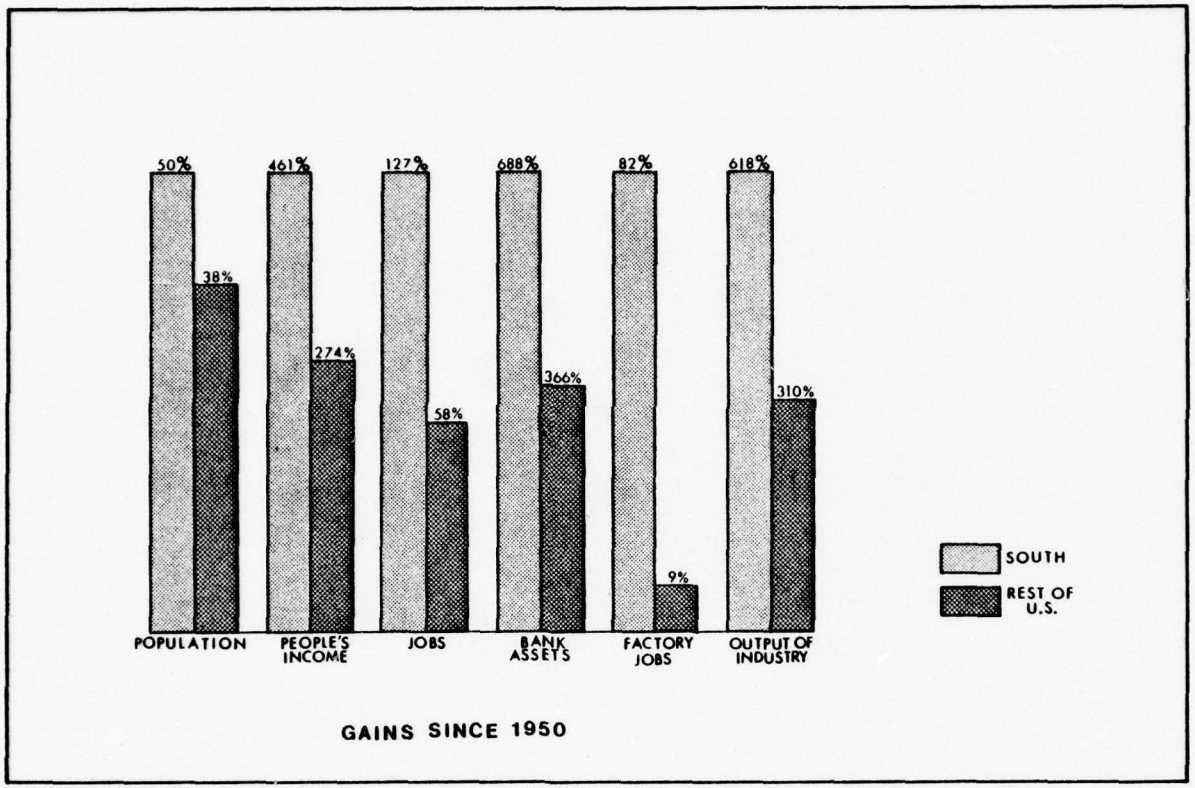

Figure 3.4 -- Gains Since 1950. Six key measures of the pace of southern growth compared to the rest of the country. (Source: U.S. Departments of Commerce and Labor; Bureau of the Census and Federal Deposit Insurance Corporation as cited by USN&WR, 2 August 1976, p. 47.)

Forces of the Southern Magnetism

No single factor emerges as the dominant cause of the migration of people and industry to the south. Indeed, there have been many such factors. Nevertheless, the supply and allocation of water is affected either directly or indirectly by migration factors such as tax incentives, right to work statutes, cost of living and civil rights issues.

The existence of southern civil rights disturbances in the past was a repressive characteristic of the region. Corporations saw little incentive to move to the troubled, often turbulent atmosphere. But the south has generally grown out of that cast and though problems do arise, a new atmosphere of progress has gained a foothold overshadowing much of the troubles.

Culturally the south has also grown. And Baptist conservatism and pride in the Confederacy has generally given way to an integrated, educated and convincingly open politically society.[17]

Most southern states have accepted "right to work" statutes which allow every man to work and forbid compelling any worker to join a union. This aspect is certainly a plus for management who see the south as having few labor unions. Some investors see this aspect quite differently. Guenther I.O. Ruebchke, executive vice president of American Hoechst (Ann Arbor News, Sept. 5, 1976, p. 46) reasons,

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[17] Sale, 1975, p. 78 and Nordheimer, 1974, p. 29 support this.

"We invest for the long term. That (the establishment of unions) could change in 20 years. We pay our people well. If they choose a union, that's their business."

Taxes have always been low in most southern states[18] (Tax Foundation Inc., 1 July 1976). This financial enticement will promote migration to the south. Though the rules may change in the future, tax inducements are hard to overlook.

Adequate site locations abound in both rural and urban settings. Choices have been predominantly rural, but urban growth is strong in cities such as Atlanta (11.3%), Ft. Lauderdale (30.1%), New Orleans (4.2%), Winston-Salem-Greensboro, N.C. (4.9%), Jacksonville (8.5%), and Richmond (5.0%) (U.S. Bureau of Census, 8 February 1976, as of 1 July 1974).

Transportation access is one of the most beneficial attributes of the south. Only two of the states being discussed could be considered land-locked (Arkansas and Tennessee), and these two have direct access to the Mississippi which is navigable. Air, highway and rail systems might be rated as good, but water or ocean access is some of the best in the country. Houston and New Orleans have overtaken Baltimore and Philadelphia as the busiest ocean ports; New York still ranks first but Charleston, Baton Rouge and Norfolk are extremely busy ports (Corps of Engineers, 1973).

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[18] This refers to state tax on individual incomes. Nine of the ten southern states have rates at or below the national average of 5 percent.

Weather is another factor in the migration increase to the south. Essentially the entire region is warm and humid. In past years, this was a reason for people to stay away from the south. But, with the development of mechanical air conditioning systems, the climate, though artificial, is more pleasant.

Power is part of the above discussion. Enormous increases are required for power generation plants and coupled with these increases is the need for cooling water. The Southeastern Power Administration is predominantly hydroelectrically oriented; they report the installed capacity of 16 projects to be 1910 megawatts as of June 30, 1972. Projects then under construction or in various stages of planning would nearly double that capacity (1,250 magawatts additional) in their service to Georgia and South Carolina (SEPA Progress Report, 1972, p. 12). Admittedly inconclusive, the indication is toward further and greater water withdrawals and greater consumption with regard to power. Power supply has consistently been adequate in the south even though requirements have grown vastly over the past decade.

What has preceded is only a general indication of the tremendous forces drawing people and industries to the south. The population trend has been documented; the industrial growth is inevitable based on stated indicators. Our question still involves the problem of water supply, both withdrawal and consumptive.

Problems, Policies, Programs and Conflicts

The quality of water is directly proportional to the quantity withdrawn and subsequently returned for further use. Over the years, the concern with water quality has shifted from a strictly public health aspect where water-born illnesses were the only real interest. Today, federal, state, and local agencies are looking at economic factors in cleaning up our nation's water resources for aesthetic reasons or for any other use which someone might desire. The situation is critical in many areas; the water resources have been damaged to the point where cleanup will be an extensive undertaking.

The National Water Commission (1973, p. 63) has stated that the primary emphasis for the next decade should shift from water development to water quality management to meet a high standard of water quality. The Commission goes on to identify the various sources of pollution (e.g. municipal sewage and storm water runoff, industrial wastes, animal waste from feedlots, sedimentation-erosion, agricultural chemical runoff, mine drainage, oil and hazardous substance spills and thermal discharges). When itemized, the list is impressive. The Commission singled out the significance of the pollution problem for increased emphasis.

The history of Federal regulations dealing with water quality control is interesting, however with one exception, it is beyond the intended scope of this paper. That exception is the Federal Water Pollution Control Act of 1972 (P.L. 92-500, Oct. 18, 1972). This

act establishes 1985 as the target date for achievement of a *"no discharge"* goal as the water quality policy of the country. What this means is that no one may discharge any waste into a river or stream. The complexity and ramifications of such a statute are overwhelming; the costs unreasonable. Industry views such a regulation as inhibiting industrial development, certainly the goal is unrealistic and a less than effective method of controlling land use (National Water Commission, 1973, p. 70). Figure 3.5 (Environmental Protection Agency, 1972, p. 151) shows the proportional economic costs involved in effluent control. The final 5% pollution reduction cannot be obtained without an astronomically high pricetag.

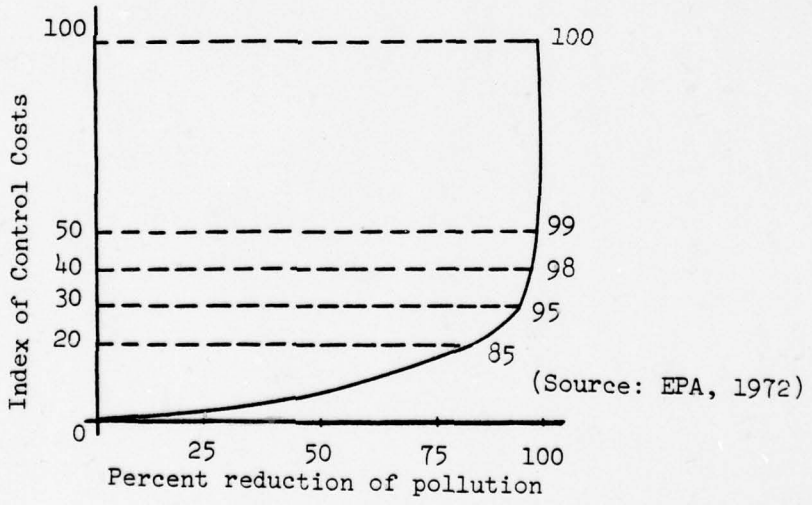

Figure 3.5 -- Cost Trend for 100% Effluent Reduction. This figure shows the tremendous cost increases necessary to reach the full 100% reduction of pollution required by the FWPCP of 1972; costs for the last 5% are twice the costs for the prior 95%.

The south has not been immune to problems of water pollution and one might question the ability of new industry to meet these federal requirements. Certainly the pollution requirement will demand continual emphasis and attention. An obvious conflict here involves the definition of pollution. In the view of some, "water is polluted if it looks bad." Others say, "water is polluted if it is not of sufficiently high quality to be suitable for the highest uses people wish to make of it at present or in the future." This is exactly what we are discussing -- the future. There will be conflicts between industrial, agricultural and domestic water uses, as well as between quality and quantity interests. The rights of both the public and the private citizen must be upheld; because of this change and turmoil it is essential that we recognize individual and local needs.

Metropolitan areas are increasing in the south (identified earlier in this chapter); with this growth comes some significant problem areas. More specifically, there are eight problems which occur most frequently:

1. Inadequate or unnecessarily costly service because too many different water agencies are operating within the same metropolitan area.

2. Poor integration of water supply, wastewater treatment and drainage services with each other and with planning for the use and occupancy of the land.

3. Insufficient attention to the nonutility aspects of providing metropolitan water services -- including neglect of recreational, esthetic, and environmental values.

4. Inadequate data, particularly on current water management practices in metropolitan areas.

5. Inability to finance future water needs of metropolitan areas.

6. Inadequate institutions for managing metropolitan water services and for determining and representing metropolitan viewpoints in Federal, State, regional and multistate water resource management.

7. Water pollution, a substantial portion of which comes from nonpoint-sources outside current pollution control programs, particularly in growing communities.

8. The encroachment of urbanization upon watersheds and the resulting deterioration of the quality of water supplies. (National Water Commission, 1973, p. 442.)

In both riparian and appropriation systems, metropolitan water supplies have received special consideration. In problem areas 2, 3 and 4, the effects of problem area 8 may indeed be critical. The problems generally deal with policy related to land use practices, a holistic system which simply will not disappear.

Of 79.8 million acres of natural wetlands in the lower 48 states, nearly 50 percent, or 39.1 million, are found in the southeastern portion of the country (Water Resources Council, 1968). This unique situation has recently become a battleground for conservationists and developers. Conservationists claim that development of these areas would disrupt the delicate ecological balance which exists in the wetland areas; for eastern shore states, these areas serve to protect the shoreline from ocean storms. Developers, on the other hand, see the marshes as wasted unless they can be turned into beneficial sites for human use. With the trends noted previously, the rights to water in the wetlands areas are sure to protract

severely contested legal battles; the rights to the land are already being litigated. The water which becomes riparian to newly developed lands will hold the same quantity and quality rights as any other waters, so, just who will be protected by these rights, the human developers/owners or the natural environment, is as yet unknown.

Several Federal programs exist which will require incorporation into a regulated water resource system. The south, because of its abundance of water, may become the headquarters or testing ground for several of these programs. Other programs, due to their nature, will draw increased numbers of inspectors, overseers, managers, etc., who want to see how the south does it. *Inland Waterways* should draw some attention as the possibility of increased access to this low cost (in both economic and energy concepts) form of transportation is desirable. *Food and fiber* programs may see new horizons in the south as the need for increased agricultural production becomes critical world wide. The south, as pointed out earlier, has tremendous potential for this increased production. Certainly, this could be seen as both a conflict between water related interests as well and as a showplace for southern efficiency in water based agriculture. Large increases of *impermiable surfaces* built over *water recharge areas* can increase flooding damages on riparian land.[19] Zoning is essential;

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[19]Damages caused by increased runoff require that a significantly large percentage of the surface must be covered with an impermiable material. Damage to ground water recharge areas is restricted by the same large percentage of impermiable surface cover.

land use planning is equally important with the delicate balance between efficiency and economic feasibility weighed as the critical considerations. Flood losses have been on the upswing in recent years, partly due to poor management, partly due to increased development of the flood plain, a practice encouraged by riparian law. We have already discussed problems with programs in municipal and industrial supply, power production (and related waste heat pollution if hydraulically generated), erosion control, recreation requirements and conservation of fish and wildlife habitat.

Conflicts abound between all of these uses, conflicts that must be solved if the south is to deal with its potential water resource demands. Certainly, tremendous supply now exists. But, as with other resources, we have found the quantity and quality to not be inexhaustable or pure for all our uses.

Reflection

Referring back to table 3.1, we can see that the withdrawal of water along the South Atlantic-Gulf was projected to be 20 percent of the total available supply by 1980 and jump to 44 percent of the total available supply by the year 2000. Remember for a moment that all of the projections made to date were made prior to or based upon the 1970 census and that the influx of people and industry into the south is far beyond the expectations of years gone by. Precise predictions of water uses in the south are not available. Current uses simply have not caught up to the tremendous growth of the

southern sunbelt states.[20] Only a few states have expended effort and funds to update projected needs.[21]

Even the federal emphasis in the past has, understandably, omitted the southern states from large expenditures for surveys of water requirements. The south, because of its longstanding status as an area with abundant water supplies, has never really been surveyed to verify this fact. There have been comprehensive studies done on the Arkansas-White-Red Basin (adjacent to the Mississippi River on the west) in the 1950's and a study completed on the South Atlantic-Gulf Basin in the 1960's. But, as of the National Water Commission's 1973 report (p. 506), the three principal basins (Lower Mississippi, Tennessee and South Atlantic-Gulf) reports had not been completed, and in a letter from the U.S. Water Resource Council (James R. Readle to James May, 3 March 1977, U.S. Water Resources Council, Washington, D.C.) the General Counsel indicated that other areas of the nation require investigation on a higher priority, again leaving the south without support.

The intent of this section is not to be critical or fatalistic.

> As a region grows, various production factors can become overused and inefficient (water

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[20]Predictions by Meyers and Tarlock (1971), Wollman and Bonem (1971), and Geraghty, et al. (1973) were based on pre-1970 predictions and 1970 census values. However, two sources: Southeast Basins Inter-Agency Committee (August 1976, revised) and U.S. Dept. of Commerce Bureau of Economic Analysis (October 1976) were studies based on growth projections after 1975.

[21]Arkansas, North Carolina and Virginia are three known; others may be underway.

> shortages, power blackouts, traffic congestion). Government bodies, implementing general desire for economic expansion in the past, have tried to remove the bottlenecks by building new dams and water systems, power sources and distribution networks. Yet, each of these essentially 'permits' growth. (Corwin, 1975, p. 164.)

Thus, realistically there is a potential problem with water allocations and withdrawals in the southeastern states and the problem is compounded by the fact that it has not been studied adequately. Yet the growth continues, and further development demands water.

In the effort to show the requirement for change it is essential to identify conflicts between the use of the water and the intended uses of associated land resources. The implications of such conflicts on future water uses should serve to identify policies, strategies and institutional arrangements necessary to alleviate the conflicts. This is one of those efforts. It is intended to propose changes which will: 1) avert *crisis management*; 2) direct attention to the regulation of withdrawals of water (rather than consumptive uses); and 3) ease the burden on court administered systems by placing the regulatory powers within a state institutional framework.

CHAPTER 4

Doctrinal Decision: Riparian or Appropriation or the Permit System

One-by-one, states across the country have noted serious deficiences in their existing water laws and have altered them. The impetus for such change has been varied, sometimes physical restrictions, sometimes social demands. Often the transition from the riparian to the appropriation doctrine has been the result of some natural disaster or catastrophe (e.g. droughts such as the years of the Dustbowl or the east coast drought of the mid-60's). But the essence of each change was to establish better water allocation procedures in times of low flow and to resolve potential conflicts of water users.[1]

Legal interpretations of both doctrines due to public interest will continue to mold the existing laws to the needs of the citizens, specifically relating to conservation of resources and protection of the environment. More recent court decisions protecting instream uses are clear indications of the tremendous effect that the laws have on our everyday lives (e.g. fishing, boating and recreation in general, see Chapter 2) despite partisan ties to either doctrine. Public rights to watercourses have, indeed, had an extremely significant

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[1] Of course, the factor of economic efficiency in the use of water under the appropriation doctrine was also important, but the essential elements of transition are apparently related to withdrawals during low flow and conflict resolution.

impact on water rights legislation in the United States.

Nevertheless, it will be the aggregate pressures of population growth, industrial and agricultural expansion, which will cause the water laws of the southeastern states to be rewritten. The tremendous pressures exerted by advances in science and technology for even greater water withdrawals will be additional, and one can begin to see that some control over water use in the southeast, some degree of regulation, must occur.[2]

There are several alternatives available to insure adequate supply of water in the southeast. Some of these alternatives are structural, others are legislative in the form of integrated land use and urban and regional planning; they are viable. Still other alternatives may involve public regulatory policy over water use and perhaps even administrative (e.g. local conservation policy established by municipal or county, etc., ordinance) enforcement of public demands. Yet, in the final analysis, the alteration of the water law more precisely provides the most effective means to regulate and control use without foreclosing any future due to irreversible resource use or environmental degredation and can occur while still

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[2]Chapter 3 shows that the population growth rate is well above the national average. The exact requirements on water for withdrawal purposes is what is important and adequate research has not been done to show these requirements.

recognizing existing, "in use" rights.[3]

In the southeast, the absence of an appropriate legal framework to deal with the potential problem areas identified in the preceeding chapter, may prove to be tragic in the future. Several states have already changed their laws regarding water resources (see Appendices B and C). The following chapter identifies the peculiarities of the three systems. Depending on the likelihood of future growth, some transition may be in order. The degree of change may vary from state to state, but the essential need for review and investigation should, by now, be obvious.

Development of the Doctrines

In the United States water laws have historically served the needs of society normally with an emphasis on optimization of economic efficiency in the use of the water. In the case of Mason v. Hoyle, riparian owners were required to "share" a water supply. Here, the

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[3]The protection of existing "in use" water rights is perhaps the strongest deterent within state legislatures to changing the laws. Individuals with long established riparian rights, even though not "in use," say that they should not lose these rights. And indeed, there is much to be said for the protection of individual "property rights;" the water is the "property" of the riparian land owners. The selection of an alternative scheme to solve the problems cannot preclude any new or different choices of future generations either. There must continue to be alternatives available for the future; the law can provide such a solution today, and in doing so produce adequate records for more precise future decisions.

law emphasized the needs of many businesses (in fact the society). The court could have ruled strictly in favor of the business which would have reaped the greatest monetary benefit, but it did not. Instead, perhaps a greater economic efficiency was served. In the west, time and again, the need for water on land sometimes distant from the source provided economic incentive to divert the water where it could be used in an efficient manner.

This adaptation of laws to the physical, social, economic and cultural environments is essential to our understanding of the relationship laws have to development of an area. In some cases the laws change as a result of development; in other cases the laws are altered to either induce or restrict growth.[4]

The riparian doctrine evolved both from European customs and from the physical setting of the eastern states -- humid and temperate climates. Consumptive uses were not allowed by the law, but this concept gradually became relaxed to the point where consumption was recognized, so long as one's neighbor was not harmed. Inland navigation evolved as a problem area as watercourses became more useful for more purposes. Here, the water became public; anyone could use the resource so long as he did not hinder any other use. For example, no riparian landowner could withdraw (i.e. store or dam) so much water that the use of the river for navigation became impossible.

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[4] Some examples of each were given in Chapter 2; TVA and CAP appear to be opposites with respect to growth inducement. TVA induced growth. CAP was the result of growth.

This concept prefaced the denunciation of the natural flow rule in favor of the rule of reasonable use. The riparian doctrine was, however, attempting to satisfy everyone in an "effort" to provide the most efficient use of the resource.

The western law of appropriation did not even attempt to appease everyone. Indeed, the basic concept of the law was "first in time, first in right," meaning the one who satisfied the requirements of the law first had the right to the water. The appropriation doctrine was strictly economic in its intent and because of this aspect is said to be much more restrictive than the riparian doctrine (i.e. restrictive in the sense that there were few changes or "special cases" allowed). Miners, farmers and ranchers simply could not have settled the west without the doctrine, for the inconsistency of the rainfall made water supply possible only through withdrawal. Social implications such as removing water from one's neighbor was allowed if the removal was done with a superior right, and in times of low flow the senior appropriator could take all of the water, leaving his neighbor with dry fields. Withdrawals of water and subsequent transportations over long distances were allowed in the name of economic efficiency. Thus, both the senior appropriators (and only the senior appropriators) were always protected, and the most efficient use of water on the land was always promoted.

The appropriation doctrine did not exist without changes, however. The diversion requirement was the first alteration; it strengthened the doctrine significantly by providing precise regulation of water

users. The next changes were restrictions placed on the return flow of water. First, the amount returned must be adequate so as not to harm any junior appropriator.[5] Knowing how much water one actually "owned" involved another alteration to the origianl law. The courts' interpretation of this return flow led to the *waste doctrine* (see Chapter 2). All that was appropriated was not necessarily available for sale; a landowner with a specified right may only *transfer* that portion which was his to put to beneficial use; the rest must be returned to the stream for withdrawal by a junior appropriator.[6] The above interpretations by the courts were often viewed as weakening the appropriation doctrine, but none could compare to the new definition of "beneficial use." This term has developed several new meanings over the years (see Chapter 2) and will probably continue to do so.

We can see in this very brief format the historical changes in the two doctrines. Equally important are the considerations of the pressures imposed by society which caused these changes to what must have been considered well established water rights doctrines. In the preceding chapter we discussed some of those same pressures as they are taking place in the southeastern states. Let us now look

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[5] If a senior appropriator decided to move his point of return, the law required that the move could not harm any junior appropriator downstream. (Meyers and Tarlock, 1971, pp. 514-521.)

[6] This is one of the basic protections of the junior appropriator. He is due any and all return flow.

at specific portions of the doctrines to discover precisely how they differ.

Riparian v. Appropriation

Even though they are often thought of as opposites, the appropriation and riparian doctrines do have several common attributes. Neither of the two doctrines allows "ownership" of the water. The right is only to use the water either diverted (appropriation) or which either flows in its natural state or for a reasonable use (riparian). The right is called *usufructory*.

Conventionalities or similarities are not, however, normally emphasized. Rather, the dissimiliar aspects of the doctrines make up most of the literature. Jacob Beuschner[7] identifies the claimed basic differences between the two doctrines as follows:

> The basic differences between riparian doctrine and appropriation principles, as usually stated, can be roughly summed as follows:

	RIPARIAN	APPROPRIATION
Source of the water right	The water right is tied to ownership of land contiguous to the watercourse. The water is, however, not owned; the landowner has a "usufructory" right only.	Contiguity of land to the watercourse is not a factor, rights are acquired by actual use. The first user acquires the best right; the second user, the second best, etc.

[7]Though now deceased, Professor Beuscher's University of Wisconsin Law School contributions to water law are by no means restricted to his home state of Wisconsin.

	RIPARIAN	APPROPRIATION
Effect of nonuse	Rights to use water are not lost by abandonment or nonuse. A riparian who has not been using water may at any time commence a use even though this may require previous users to reduce their withdrawals. There is, however, the chance that established users may get rights by prescription.	Nonuse of an appropriation right may result in its loss by abandonment.
Place of use	Many riparian state cases indicate that the water must be used on the riparian land itself; others permit use on nonriparian land as long as other riparians are not measureably harmed.	The appropriator may transport to, and use the water on, nonriparian land; in fact, use in another watershed is permitted.
General nature of the water right	Riparians are thought of as correlative cosharers in a usufructuary right to make reasonable use of water; there is accordingly no fixed quantity of water assured to any riparian.	The appropriator, once he has established his right by proof of earlier use is entitled to a specified quantity of water as against appropriators later in time. (Little attention is paid to the fact that many water users in the west actually depend for their water upon a contract with an irrigation district.)
Natural flow	Earlier case law emphasized more than current cases the natural flow requirement of a waterwheel economy, namely, that after using water the riparian was to return it to the watercourse so the water would flow as it was "wont" to flow. Today concepts of public rights or public trust are more effective in preserving minimum flows in streams or levels in lakes.	There is no natural flow notion. The appropriators can take as much water as they are entitled to take even though it exhausts the watercourse. It is this aspect of assumed appropriation law which particularly arouses conservationists. Some western states, however, permit the states to file for and ultimately acquire a right to the unappropriated flow and thus preserve such flow, if desired. (1961, p. 227)

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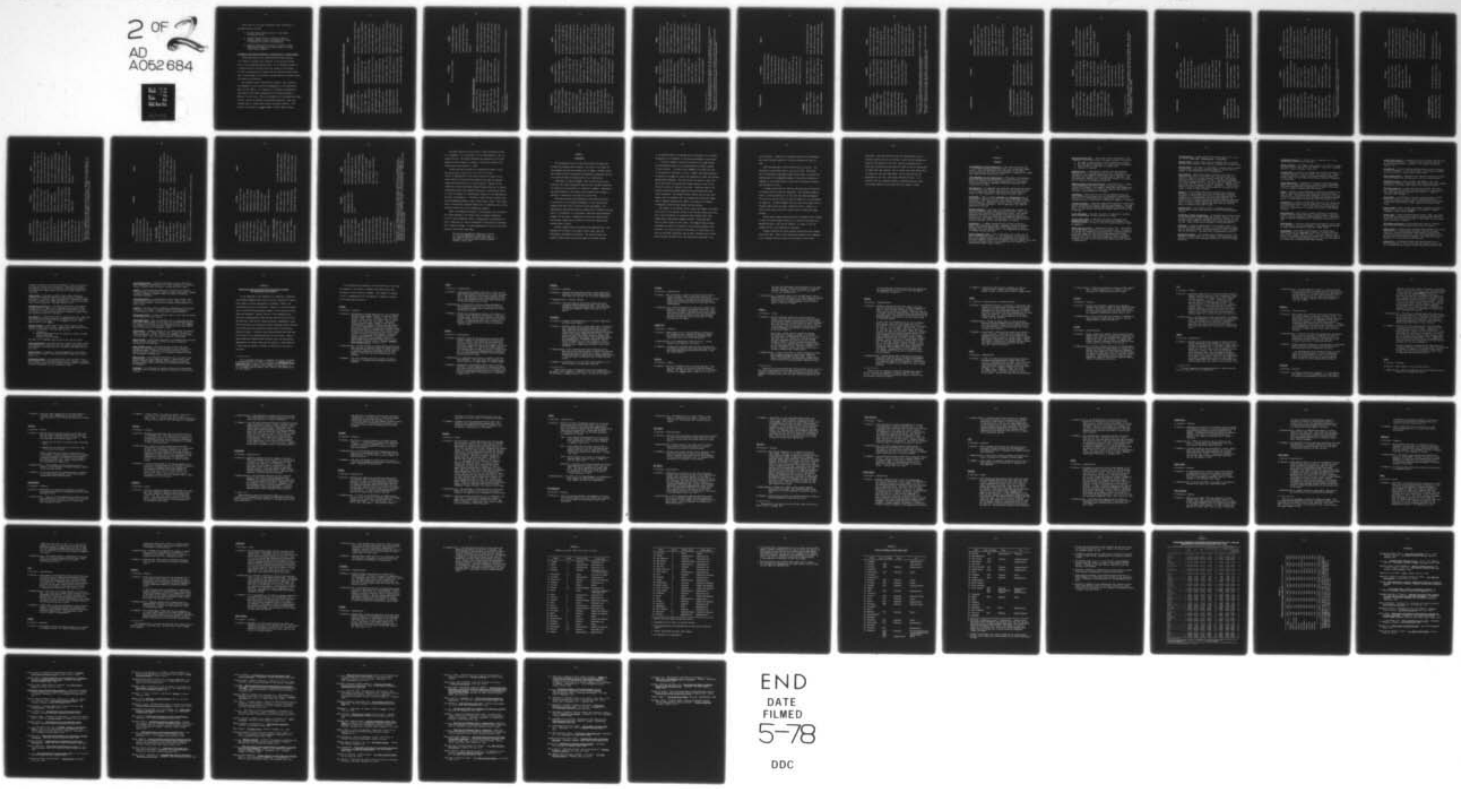

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Davis (1971, p. 13) sums up Beuscher's basic principles of riparian theory as follows:

1) Riparian theory denies priority of right based on priority of use.

2) Riparian theory refuses to establish rights to specific amounts of water, but defines all rights by reference to a test of reasonableness.

3) Riparian theory restricts the use of water to lands physically proximate to the water supply and thereby retards water transfers.

Southeastern Application (Riparian v. Appropriation v. Permit System)

Having described the two contemporary/traditional systems, it is useful to evaluate their relevance to the specific problem area of the southeastern United States. It is furthermore essential to describe the two doctrines within the context of the problem. Is there a pressing need for change from the riparian doctrine prevalent in the southeast to a system with possibilities for greater control over water use allocations?

The problem at hand is significantly complex. And, because of the geographic as well as political aggregation of the southeastern region of the sunbelt, it is essential to establish the adequacy of each system in that region assuming that the trends projected in Chapter 3 do take place. While the problems to be encountered are large in scale, they do not present insurmountable obstacles. They only indicate areas of concern which require increased attention. What follows is an analysis of three systems of water rights doctrine.

Overview of Appropriation, Riparian and Permit System of Water Rights Doctrines

APPROPRIATION	RIPARIAN	PERMIT
1. Priority of Right		
The allocation of water is based solely on the concept of first in time, first in right, subject to beneficial use. The ability to make use of the water is given substantial consideration; nearness of the source of the water carries virtually no weight; the water may be transported anywhere. Economic efficiency is the primary concern of any allocation.	The allocation of water is solely determined by the direct accessibility of the water from adjoining land. The ability of the land to make use of the water is not a consideration; often adjacent land cannot economically use the water to which the owner holds riparian rights. Use of the water right on non-riparian land or on land which is riparian but beyond the boundary of the watershed which supplies	Transition to a permit system should not alter any existing rights. However, in the spirit of appropriation, after a period where beneficial use could be established, all unused riparian rights would cease to exist. Permits to withdraw water would subsequently be required of all those who desire to withdraw water, even prior riparians, primarily for the purpose of regulation. Those with pre-transition rights have the first priority all based on equal footing; those

APPROPRIATION	RIPARIAN	PERMIT
	the water is not allowed.	who request permits subsequent to enactment of the statute will take their priority according to the date of their permit; the earliest has the senior priority.

2. Initiative for Planning/Development

Rights to specific allocations may be purchased outright. Once the right is established only lack of use or misuse can alter the right.[8] Thus, it provides secure/certain, fixed amounts	Any land developer desires certain withdrawals of water; often the withdrawals are consumed and not returned directly to the stream. Strict interpretation of the riparian doctrine does not	Compared to the riparian doctrine, the permit system offers considerable security to the developer or investor. There may be some hesitation if the permit takes on the aspect of being a *term authorization* subject to review on either

[8] Normally the state law specifically spells out durations of non-use and defines the numerous instances of misuse.

of water. There is little flexibility in the system; any that exists is incorporated in judicial interpretations over time. Over-allocation or excessive diversions are common. *"Paper rights"* are recorded for more water than is actually available while at the same time, no specific plans are made for total quantity of water diverted or for the return flow and its conservation (Meyers and Tarlock, 1971, p. 117). Style or quality of

allow consumptive withdrawals; when comsumptive use is allowed, there is no guarantee that, in the future, it will not be revoked. The foundation of the doctrine rests on the fact that adequate flow will remain in the watercourse. If too many consumers enter into use, the right of a downstream riparian will be in serious jeopardy. There is adequate flexibility in the system to allow such modifications of the doctrine, but such alterations may lead to uncertainty of

a recurring basis (e.g. every two years) or on a discrete basis (e.g. in 20 years). Or, the right may be subject to invalidation at the discretion of a regulating agency. But then, it would be the duty of the agency to forewarn of any such action and implementation of a permit system should consider the security of a developer in the drafting of the law. It has been the experience, thus far, that once a permit is issued, only misuse or non-use make it revocable (Sax, Water Law 792, lecture notes, Fall 1976). Nonetheless, the ability of any institutional process which

APPROPRIATION	RIPARIAN	PERMIT
development is not restricted by access or transfer limitations. One must remember that the appropriation doctrine was established primarily for developmental purposes; it does provide the security sought by investors.[9]	supply. No developer is willing to invest into such an insecure system, yet the states that adhere to riparianism seem unwilling to sacrifice the flexibility which exists for the security which they would receive.[10] Style of development is also hindered. The doctrine states that users must be adjacent to the stream; industries or housing developers	could revoke a permit will be a matter of concern for an investor and should be of concern to the drafter of legislation. One outcome of such a system would be the amount of information on availability of water both in quantity and quality. These data would be of tremendous value to planners on a large, regional scale where quantity and quality research simply has not previously been done.

[9] This makes the appropriation doctrine desirable not only to developers but also to states that desire to encourage development; this appears to be the situation in the southeast.

[10] This is crucial to the planning efforts of the southeastern states (the law must be altered) depending on the state policy toward expansion of the state (economic growth).

APPROPRIATION	RIPARIAN	PERMIT
	may find that such land is either not available or that non-riparian use of the water is not allowed. Owners of riparian land may sell the land, but they often do so at very (uneconomical) prices. Non-riparian land (i.e. that which does not adjoin the stream) may provide for the most efficient use of the water, but lacks approval for a diversion.	
3. Transfer		
Appropriative rights are simply easier to transfer, buy or sell, than are riparian rights. These rights have no geographic	Here, the reference to the usufructuary right to water is essential. Generally, a riparian may not sell land without the right to water. If	It is the expressed purpose of the permit system to promote economically efficient use of the water resources available. This purpose would include the stipulation within

boundary and so might cautiously be considered more flexible.[11] However, any appropriative right worthy of purchase as security is probably over priced. Thus, as presented earlier, buyers have been encouraged to seek Federal assistance rather than invest in the appropriated right.

he is allowed, however, he must so stipulate the transfer (as well as any reservations) on the sale agreement. While some states allow the sale of water separate from the land (ref., Appendix B and Dewsnup and Jensen, 1973), there seems to be little certainty for the buyer that this purchased right will remain intact.[12]

the body of the law allowing sale and transfer of the permit right to any buyer. The buyer must be willing to assume <u>all</u> of the conditions of the permit including both the priority and the expiration date of the permit. In the interest of the buyer, his expressed intent of the use of the water should be subject to approval by the same administrative agency that issues the permit. Following the transfer, any serious deviation from the

[11] Herein lies a problem; should riparian rights become appropriated in the southeast, could any part of the Mississippi River be purchased and piped to west Texas?

[12] Established riparian owners, though they cannot claim prior rights, have carried substantial weight in courts. Decisions are often made against the new *prescriptive* owner.

APPROPRIATIVE	RIPARIAN	PERMIT
		expressed use would be subject to review and/or regulation. In other words, a new owner accepts the term and priority of the existing owner but imposes his own use on the system. Finally, even the term of a permit right is a negotiable aspect of a transfer and could easily be adopted to the desires of the state.
4. Allocation During Scarcity		
There is no sharing of scarce water as in riparian law. There is no proportion set up to provide some water for all. During scarce water periods, lower priority (junior)	Riparians normally share scarce water according to the proportion of land owned. Often, the proportion is in accordance with the property owned which fronts on	Water would be prorated to users on an equitable basis considering the needs and uses of the water presently permitted. This equitable apportionment would, admittedly, be somewhat subjective,

APPROPRIATIVE	RIPARIAN	PERMIT
appropriators are allowed no water even if it means loss of high value crops. Meanwhile, the senior appropriator may be withdrawing what for him is still marginal water, *saving* his marginal, low-value crops. Thus, risks and losses are unequally distributed in time of scarce supply.[13]	the watercourse. During low flow periods allocations may not be equal, even though they are proportional. A cutback of each owner by a specified percentage is often difficult to regulate. Some users might consider a cutback as marginal, while to other users such a proportional reduction may be disasterous. (E.g., a 25 percent cutback of water may destroy a small farmer's high value	but it would also provide impetus for accurate records of withdrawals and uses as security in time of shortage. The apportionment would necessarily be performed in accordance with adequately verified records.

[13] However, "a public agency, formed to rationalize a multitude of individual rights, may acquire them and manage them centrally, and again provided that one agency does not try to acquire water from another..." (Gaffney, 1969).

APPROPRIATIVE	RIPARIAN	PERMIT
	crops whereas a larger farmer may be able to absorb the reduction easier or his crops may not be as susceptible to water shortage.) Storage of water for use in times of low flow has a mixed history of litigation. Generally, reservoirs are not permitted. When storage is allowed, riparians all along the stream have equal rights to that stored water when it is released.	
5. Management		
Regulation of rights is normally eased by relatively adequate records and a specific	Appendix B provides basic data concerning the management procedures used in riparian states. In general, there	Conflicts between users with vastly different views of water use (e.g. conservationists, industrialists, agriculturalists) will

APPROPRIATIVE	RIPARIAN	PERMIT
administrative mechanism to resolve most conflicts. Institutional procedures in most states have statutory powers taking tremendous pressure off of the courts which need only hear the most involved cases; one such method is statutory adjudication of rights. Joint management of surface and ground water resources often conflict as surface rights have, thusfar, taken	are no procedures, no institutional administrative methodology for obtaining or regulating or resolving disputes over water resources.[14] Records of riparian water rights are virtually non-existent. There is no mechanism for state or local regulation or determination of available water. Resolution of conflicts is handled almost exclusively by the	probably never be satisfied with any system which attempts to handle more than one doctrine simultaneously. Nevertheless, the removal of all requirements for resolution out of the courts is certainly a point in favor of the permit system. Administrative and institutional procedures could be easily identified and would provide the means needed in the southeast to regulate future uses. Davis (1971, pp. 70-73) says that the adequacy of legislative guidelines and standards governing

[14] That is, use itself is not regulated in riparian states; thus, there are no institutional arrangements for resolving disputes, only the courts.

APPROPRIATIVE	RIPARIAN	PERMIT
priority over management of subsurface withdrawals. But, appropriation <u>legally</u> recognizes and protects a specific quantity of water.	state courts. Withouth a specific procedure, legislative, judicial, administrative or otherwise, joint management of surface and ground water resources are impossible.	the powers of those who administer the permit system must be complete and precise. Unless intended, the process of regulation should leave no real chance for administrative declaration of policy. This aspect should be determined outside of the permit system itself where policy decisions are representative rather than accidental or a product of misinterpreted powers.
6. <u>Strength of Doctrine</u>		
Supplemental Federal, state and local laws relating to land use, pollution control,	For the purposes of economic efficiency, the riparian doctrine can only be	The permit system may be as strong and inclusive or as weak and exceptional as

APPROPRIATIVE	RIPARIAN	PERMIT
flood control and conservation of the environment often conflict with the understood rights of the appropriator. The judicial interpretation of these conflicts may tend to weaken the doctrine, but otherwise appropriation is a firm system. Minimum flow legislation is often used; as with normal resolution of conflicts, the most senior appropriator	strenghtened by supplementary Federal, state or local laws relating to land use, pollution control, flood control or conservation of various environmental entities. Minimum flow legislation is a possibility, but this does not recognize a superior right if the water drops below that established minimum level.	desired.[15] But it appears that the weak systems are also those with extensive exception clauses and are also those with the most chance of producing more conflicts than they resolve. Simplification of the system is a must with allowance for as few exemptions as possible. Supplemental Federal, state and local laws pose no serious conflicts. Minimum flow regulation is also essential.

[15]This point is emphasized in light of any state's desire to implement the system gradually. It also refers to the local (state) need for a strong system. If there is no need, then the law need not be stated strongly, thus, able to be altered in the future.

APPROPRIATIVE	RIPARIAN	PERMIT
who was previously allowed to divert the entire flow of the stream may now divert water down to the level of minimum flow.		
7. Loss of Right		
Appropriative rights may be lost in a variety of ways. *Abandonment forfeiture* through non-beneficial or adverse use, failure to develop an appropriation with reasonable diligence,	Riparian rights are not subject to forfeiture and may not be lost due to nonuse for any length of time. The riparian right is considered to be a vested right in this regard. There are, however, several ways for a	Periodic permit review should suffice to alleviate any questions in this regard. Otherwise, any misuse of the right should be grounds for revocation.[16]

[16] This too is alterable in accordance with the needs of the individual state.

APPROPRIATIVE	RIPARIAN	PERMIT
estoppel and a host of minor state recognized procedures are grounds for the loss of rights. However, one's right is essentially secure if the supply is adequate and his diversion is intended for beneficial use.	riparian to lose his right. These include *adverse possession* or *use*, *laches*, *prescription* (which may subsequently be lost by *abandonment*), *unreasonable harm* done to another, *estoppel* and others (see Glossary, Appendix A).	
8. Public v. Private Uses		
Recognition of a minimum flow is essential to the preservation of public rights to appropriation governed water. Otherwise, all water is public.	Acquisition of public access rights for use of certain waters is essential. Critical problems involve balancing private and public use while facing	As already expressed, the primary purpose of the permit system is regulation of the water resources. As an integral part of that purpose is the release of a large quantity of water which is now

APPROPRIATIVE	RIPARIAN	PERMIT
The conflicts between other regulations as specified in "strenth of doctrine" have, until recently, gone against public rights to water. Current philosophy seems to be moving toward the recognition of the public's right not only to the water but also to the esthetic beauty found in wild rivers or the wildlife that inhabit these areas, as well as the recreational benefits of the water supply.	conflicts of economic development and resource conservation for social use.[17]	private to the public sector either for public use or for further private appropriation. In any case, the permit system will be a positive impact on the adequate balance between public and private use especially in the eastern, riparian states. (National Water Commission, Final Report, 1973, p. 272.)

[17] Recognition of the problems involved in not establishing a minimum flow is essential to the resolution of many of the conflicting public and private uses. It is possible to identify the problems in advance and to specify a minimum flow level. Public agencies are normally the only ones who can establish uses in what many consider to be private waterways. Zoning restrictions are also crucial to this concept.

The permit system can easily serve a viable alternative either as a supplement to or a substitute for the inefficiencies of the riparian doctrine. The system represents the compilation of the best aspects of both systems into a means to control and conserve this valuable and unique resource -- water.

We have now seen the spread of riparianism from east to west; and we have seen a reversal as states took on the many aspects of appropriation. This later trend was not based on doctrine; rather the trend has been founded in the need for adequate regulation and allocation of a scarce resource. Reasons for the change have varied from Federal pressure (Desert Land Act) to natural catastrophies which have prompted transition to a more secure system in times of shortage (i.e. Mississippi's adoption of the appropriation doctrine, see Appendix B). Society as a whole has more recently used the environmental movement to gain certain public rights. The drought years of the mid-60's presented America with circumstances which should indicate the need for stricter regulatory controls.

Today, the tremendous pressures of the migration into the sunbelt are further symptoms of the urgent need for adequate legislation in all of the southeastern states. Holding back on preparations for such a transition will only be burdensome to those who will ultimately have to make the change. It seems appropriate to close with one short quotation from Senator Frank Moss:

> For the next generation of Americans, I believe it is not an exaggeration to say that water -- its competing uses and conflicts that arise out of those uses -- may be the most critical national problem. (Moss, 1966)

CHAPTER 5

Conclusion

The southeastern corner of the United States has always been blessed with abundant water resources. Yet, part of the reason for the abundance has been the relative lack of demand. Northern states had a large portion of industries and population; midwestern and western states provided the large portion of U.S. agriculture.

Today much of this has changed. The south and the west combined now have larger populations than the north and many industries are moving into the southeast for a variety of reasons. Agriculture has great potential in the south; total irrigated land acreage is expected to increase by 50 percent by the year 2020.

The west has always had problems with water supply and early in the history of the economic development of that region states adopted their water laws to provide for this development. The appropriation doctrine has become an integral part of western life and, while it is understood to be inflexible, there have been substantial changes over the years. Nonetheless, the doctrine remains strong and provides a great deal of security to those who long ago established rights to water.

Several southern states have analyzed the applicability of the appropriation doctrine to the needs of their state; only one, Mississippi, has adopted the doctrine. But several others have adopted a newer system of water law known as the permit system.

It incorporates many of the appropriation principles, yet is flexible enough that it is adaptable to the unique requirements of each state.

A review of Chapter 2 will show a series of U.S. maps showing the chronological adoption of the appropriation or permit systems of water doctrine. It would be poor judgement to believe that this is the spread of a doctrine; it is not. Rather, the trend represents the spread of the need for control and regulation of water uses through administrative measures. The west now has the ability to deal with any of their water allocation/water rights conflicts, and, for the most part, they do so outside of the court. Certainly, many of the disputes are handled through adjudication and various other regulatory techniques. The southern states, however, have no such techniques, laws or procedures (such as adjudication) which would enable them to regulate riparian water rights; such rights are incapable of regulation except through lengthy judicial process.

The essence of the problem, then, is what will happen to the water laws in each of the southern states as more and more people move south due to jobs and weather, as industries desire greater water withdrawals and as agricultural demands increase? Projections made prior to 1970 or based on 1970 census and commerce figures placed withdrawals of water at 44 percent of the available supplies by the year 2000. But with the growth of the south in so many areas, at a pace not previously considered, then by 2020, estimates such as those made by Wollman and Bonem (1971) may become more "reasonable" than

just "possible." Indeed, their estimates indicate that withdrawals may exceed available supply for the South Atlantic-Gulf Basin by 2020.

There are many ways to help preclude such an occurance. The alteration of state water laws is only one of them. State water resource planning and management agencies must begin to consider the ramifications of the aggregate demands on their water resources as compared to their legal ability to deal with the potential problems. And they must do it now.

It seems obvious that the time has come when precise evaluation of southern water uses must be researched. The tremendous supply of water, so long considered part of the south, may become endangered in the not too distant future, at least in respect to its availability for human use. One must remember that such uses involve many acres of wetlands, many rivers and ponds, streams and rivers. There is no need to drain these areas dry to enable others to share this great resource.

Should those southern states which have not adapted their concepts of water law toward greater control do so, then the trend which has spread from west to east will be complete. At least, it will be complete so far as the southeast is concerned.

Already identified are those southern states which have changed their water laws. Part of their reasons were based on the inadequacy of the riparian doctrine to deal with the growth of the states.

Furthermore, there was the belief that the interpretation of the riparian doctrine was still an attempt to solve all the problems and supply all the needs, all the time. This is an impossible task. There must be priorities; there must be review of uses so that growth, or simply life, may continue. And of course, most would prefer them to continue as they know them today. But we cannot provide for everything all the time. The western settlers saw this. It is essential that the southeast undergo an evaluative process, based on thorough research, and conclude then what change is needed.

APPENDIX A

Glossary

5th Ammendment (of the Constitution) -- The rights of persons that "...no private property be taken for public use, without just compensation." Thus, the Ammendment covers the rights of individuals to private property and covers the requirement to compensate for taking these rights without due process of law.

10th Ammendment (of the Constitution) -- "The powers not delegated to the United States by the Constitution, nor prohibited by it to the States, are reserved to the States respectively, or to the people." Thus, the States Rights' ammendment (expressly permitting states to make their own laws).

95th Meridian -- the imaginary line which runs north-south and divides the country into two sections, east and west. The meridian is also a line of demarcation between states with scarce water resources (west) and those considered to have adequate rainfall (east).

abandonment -- when an "owner" knowingly and intentionally fails to use his water right he is subject to the loss of that right through abandonment. (This situation was often extremely difficult to prove; intent normally is. Therefore, the usual loss of a right through non-use is through *forfeiture*.) This is applicable only under the appropriation doctrine.

absolute ownership -- used here, the term means that the owner of the land overlying a water supply also owns the water. This is not always the case, especially in appropriation states. This concept grew before the science of ground water hydrology was very well understood and viewed the ground water as completely separate from surface water, thus capable of being "owned" and used in any way the overlying landowner saw fit, even wastefully if he chose.

adjudication -- a legally binding division of water according to superiority of appropriative right. Sometimes a survey of existing rights is known as an adjudication when an ongoing suit requires knowledge of who owns how much water. This administrative procedure is normally binding judicially.

adverse possession (use) -- this is the actual loss of the title of land or property (e.g. water). If one "acquires" a certain piece of land from a neighbor and uses the land continuously for a period of time (most commonly 7 years) with no complaint from the original owner, then he actually acquires title to the land and any of the rights (e.g. riparian water rights) that go with it.

Appropriation Doctrine -- the system of water law adopted by (and dominant in) most western states. The basic tenants of the law are:

1. The right is based on date of initial acquisition of water.
2. The right must be maintained (i.e. must be used continually).
3. Water in excess is available for another user.
4. Diversion is required.

beneficial use -- a term which by tradition has been expressly reserved for use in the appropriation doctrine. Some uses are "beneficial" (e.g. domestic, agricultural, cattle watering). Other uses were long considered to be not beneficial or "wasteful" (e.g. in-stream uses, swimming pools, watering golf courses). Of course, most of these are now accepted as beneficial.

Commerce Clause (of the Constitution) -- part of Article 1 -- Legislative Department, Section 8 -- Powers of Congress, Clause 3 -- Regulation of Commerce. The Commerce Clause prescribes Congressional (powers) in the regulation of interstate commerce, specifically as used here, in the regulation of waterways.

consumption -- water which is lost from any immediate future use. Water withdrawn from a supply and due to absorption, transpiration, evaporation, or incorporation into a manufactured product, is not returned directly to the surface or ground water supply, is "consumed."

correlative rights -- today such rights refer primarily to ground water sources (specifically in Hawaii, California and Arkansas). The right deals with proportionate sharing among landowners overlying a common basin. It does take into account the relative values of use in times of shortage.

crisis management -- any type of control or regulation or planning which occurs because "crisis" requires it to occur.

critical flow levels -- used here, the term is synonomous with minimum flow level. It is the level where certain damages to the river life itself or to man (i.e. due to high pollution level) might be dangerous.

Desert Land Act of 1877 -- (Chapter 107,19 Stat. 377). This Federal Act granted lands to settlers in twelve western states. Included in the law was the "separation of land from water," very much different from patent lands, and essentially giving appropriative rights. Though not intended to usurp the privilege of states to determine their own laws, the Act was often misunderstood and interpreted as a mandate for states to alter their water rights laws from riparian to appropriation.

drainage basins -- a land area from which water drains into a river. Also called, water shed, catchment area or river basin.

Eastern states -- those states which are generally east of the 95th meridian, from Minnesota, Iowa, Missouri, Arkansas and Louisiana, east.

eminent domain -- the right of a government to acquire private property for public use, even from an unwilling owner, so long as there is payment of just compensation (see 5th Ammendment).

equal footing -- when a state enters the Union (of states) it is understood that this is no "second class" citizenship, that its position is equal to all other states in every way. (The problem involved is with the "ownership" of water. The Federal Government often said "we own this water." And, in all but the original thirteen (13) states this was true -- at one time or another. However, this was not true for the original thirteen. Therefore, if these thirteen states own all the water within their boundaries, so should all the others -- based on "equal footing.")

estoppel -- if a riparian owner assists another riparian owner in making use of their common water, such as assisting in surveying the canals or constructing facilities, but then complains that his neighbor's use is unreasonable, most courts would say that the complaintant is "estopped" from further charges because he knew about the uses, aided or even encouraged that which he is now complaining about. To permit further legal process would have the practical effect of working a fraud upon the user.

Food and fiber -- any program or series of programs intended to improve and/or increase the production of food or fibrous materials (cotton).

Forclosure on future alternatives -- if flooding requires some solution for the public good, a dam or levee may provide a solution. But, the economic, resource and land consumption required to provide the solution may prohibit change in the future due to some new technology or law, etc. Thus, we will have foreclosed on future alternatives.

forfeiture -- should an appropriator or his successor cease to use water for a specific period of time (2 to 10 years; varies by state) then the right shall cease. The water reverts to public use and may again be appropriated. Applicable only to appropriation doctrine.

ground water mining -- the condition when withdrawals are made from aquifers at rates in excess of net recharge. The underground supply depleted, the water table eventually drops below a level of economic extraction.

impermiable surfaces -- a surface such as a parking lot or roof, through which water does not penetrate.

inland waterways -- any stream, river, estuary, etc. which is capable, and often used to carry traffic and commerce. Often such a waterway consists of canals, channels, locks, etc.

instream uses -- any use of the flowing water without diverting it or in any way removing it from the stream is an instream use. Though considered wasteful for years, such uses as boating, fishing and esthetic beauty of the stream are now being accepted as "reasonable" and "beneficial."

junior appropriator -- anyone who is allowed to appropriate after someone else or whose appropriation is restricted by another's use. (The junior appropriator is always granted the right to the return flow not consumed by appropriators more senior.)

laches -- refers to a prior knowledge of a potentially harmful event, such as downstream dam which might flood your land, for an undue lapse of time. Also requires some negligence in failing to act when the party had knowledge of facts which should have prompted stronger action. In some states, one loses his right if he fails to act.

minimum flow -- a level of stream flow required for the preservation of certain characteristics of the stream (e.g. fish life, flora or pollution levels, etc.). Such a flow level can be established and must be if conservation is to continue in the face of vast demands for water.

multi-objective -- most likely a series of projects or structures intended to serve several objectives (economic stimulus, power production, improved navigation, induced migration, etc.). The methodology is much more system-oriented, covering most possibilities of use.

multi-purpose -- a project or structure(s) developed to control water for a multiple of uses, simultaneously. Thus, through some economy of scale, several uses may be served by a single design.

no discharge -- here used in relationship to the Federal Water Pollution Control Act Ammendments of 1972 (P.L. 92-500, 18 October 1972, 86 Stat. 816,33, USCA 1251-1376). The policy prohibits discharge of any harmful substance into a water body. Strictly applied, the policy would forbid discharges which are not within the capacity of a water body to assimilate and render harmless.

natural flow (rule of) -- originally the rule of natural flow was part of the English Water Law. It requires that no water be consumed but that all withdrawals be returned to the stream to sustain its "natural flow."

non-riparian -- the word riparian basically means one who is adjacent or next to something. In the case of water, a non-riparian is someone who owns no parcel of land touching a water course.

North central states -- Minnesota, Iowa, Wisconsin, Missouri, Illinois, Indiana, Michigan, Ohio and Kentucky are the north central states.

Northeastern states -- Maine, Vermont, New Hampshire, New York, Connecticut, New Jersey, Pennsylvania, West Virginia, Maryland, Delaware, Massachusetts, and Rhode Island make up the northeastern states.

Northwest Ordinance -- a land grant from which several states were cut. Generally, the Ordinance represents water law in and around the Great Lakes and specifies that all of the waters, "...shall be considered common highways..."

paper rights -- specifically in the west, one after another, claims are made for water in a stream. Without adequate records, the claims could exceed available supply. Such a situation often results in adjudication with the most junior appropriator having no legal claim.

partial permit -- when a permit system makes a substantial number of exceptions to those who are required to have permits it might be considered a partial permit system.

patent lands -- around the mid-nineteenth century (1850), many lands of the western territories were given to new owners under "patents." (Along with these lands went the right to water under the only system known at the time -- riparian.)

percolating ground water -- water which seeps, oozes or otherwise moves from the surface downward, filling up all pore spaces.

permit system -- system of water law which makes excellent use of local characteristics in establishing a system of controls over water resources. Only those with permits are allowed to withdraw water (often under severe restrictions). Often the authorization is for a specified time period, usually renewable. The system would apply to all water use (e.g. ground and surface waters).

prescriptive -- prescriptive rights arise when one makes use of another's property, or when one uses his own property in such a way as to infringe upon the rights of another for such a period of time

(commonly 20 years) as to become an easement or right on the part of the party who conducts such an activity. These are not titles to the property, and thus are distinguished from *adverse possession.* The prescriptive rights require that the use be open, hostile and continuous.

pueblo rights -- basically of Indian origin, these rights are "supreme" in dealing with demands on water placed by a community or municipality. In effect, these rights allow the withdrawal of water necessary to support the community regardless of the size and regardless of future expansion. The right cannot be lost.

reasonable use (rule of) -- the American adaptation of the English Riparian Doctrine. This rule of reasonable use allowed for some consumption and required that the quantity and purpose of the use be reasonable (a term which has never been adequately defined though the courts have ruled on it for years).

res communes -- a French term found in Louisiana water law. This term influences the riparian doctrine by identifying that "all water is free to be used by all men" and "to be owned by no man." Thus, riparian water is not owned.

Riparian Doctrine -- the system of water rights adopted by (and dominant in) most eastern states. Normally the right requires adjacency to a watercourse. The right must be used:

1. reasonably,
2. without diminishing either the quantity or quality of water flowing downstream,
3. shared in time of shortage.

The right is not dependent upon use and is not lost by non-use.

senior appropriator -- the first person to divert water along a watercourse and put it to beneficial use. His right is exclusive of all other demands on the water and all those whose claims come after his are junior.

single purpose -- a project or structure prepared for one specific intent (i.e. to control floods, provide power, supply water, dilute waste, etc.).

Southeastern states -- the ten states which lie to the east of the 95th meridian and in the southeast corner of the continent. Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Louisiana and Arkansas are the southeastern states.

Southwestern states -- (Southern) California, Arizona, New Mexico. Also considered as components of the "term" southwest are: (Southern) Nevada, (Southern) Utah, (Southern) Colorado and (West) Texas.

sunbelt -- those states which make up the "sunbelt" are Virginia, North Carolina, South Carolina, Georgia, Florida, Mississippi, Alabama, Louisiana, Arkansas, Tennessee, Texas, New Mexico, Arizona and (Southern) California.

term authorization -- a characteristic of the permit system. Here, an authorization is given to the use of water. After a time, the permit must be renewed. This term is normally pre-determined at the time of issue.

transfer -- the sale, trade or otherwise relinquishing of one's right (water here) to another. (Generally allowed in an appropriation or permit system, often not allowed under a riparian system.)

underground stream -- a freely flowing stream or river under the ground. The stream has a definite channel.

unreasonable harm -- when the reasonable use of a water right by one owner harms another owner in such a way as to be determined "harmful," the right to use the water in that manner may be lost. (For example, the irrigation of a field which has a single outlet and when drained causes severe erosion to a neighbor's land.)

usufructurary -- normally referred to as a usufructurary (or riparian) right to water use. Though riparians often consider the water as "privately owned," it is not. There is no ownership, only the right to use the water. Thus, the right is known as usufructurary.

waste doctrine -- specifically applicable to the appropriation doctrine, "waste," as the term implies, is water use which is excessive, non-beneficial or inefficient.

water recharge areas -- areas which because of their soil type, geology, etc. are capable of carrying water from the surface to an underground supply. Obviously, to cover the area with a surface material causing the water to run off elsewhere, prohibits the area from serving as a recharge area.

Western states -- the seventeen states which lie to the west of the 95th meridian (excluding Alaska and Hawaii). North Dakota, South Dakota, Nebraska, Kansas, Oklahoma, Texas, New Mexico, Colorado, Wyoming, Montana, Idaho, Utah, Arizona, California, Nevada, Oregon and Washington.

withdrawal -- the diversion and removal of water from a watercourse. Withdrawal does not necessarily represent a depletion of any quantity of water.

APPENDIX B

Historical Briefs of Current (1977) State Water Doctrines and Administrative Procedures[1]

At the beginning of this appendix it is essential to emphasize the mistaken assumption that states are neatly classified in terms of water rights as either appropriation or riparian. Rather, the classification is one of convenience. Though it is true that states east of the 95th meridian generally adhere to the riparian doctrine, there are exceptions. Equally incorrect is the assmuption that there are 19 appropriation states and that they are all west of the 95th meridian. Many states, though espousing a predominantly appropriation doctrine, have nonetheless always recognized certain riparian water rights and have consistently applied some of the essential riparian concepts. Conversely, many riparian states have found that the doctrine did not adequately provide for their needs. Many of these states have adopted "permit" systems, which are substantially appropriative in concept except that the permit is often issued for a fixed term, and subject to renewal or revocation at the end of that term.

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[1]It is extremely important to recognize the efforts of Richard L. Dewsnup and Dallin W. Jensen, co-editors of A Summary-Digest of State Water Laws, A report to the President and the Congress of the United States by the National Water Commission (Washington, D.C.: U.S. Government Printing Office, 1973), which is the primary source for this appendix.

The following briefs represent the classification of each state with respect to its efforts to regulate and control water uses followed by a short historical summary. (See figures 2.2 through 2.9 for a comprehensive view, and Appendix C, Summary of Current (1977) State Water Doctrines.)

ALABAMA

a) Doctrine -- Riparian

b) History -- Mid-nineteenth century decisions led to an established riparian law in Alabama (Hendrick v. Johnson, 6 Part. 472 (Ala. 1838); Stein v. Burden, 24 Ala. 130 (1854); Burden v. Stein, 27 Ala. 104 (1855); Stein v. Burden, 29 Ala. 127, 65 Am. Dec. 394 (1856)). The period 1880-90 witnessed drastic changes in the judicial interpretation of commonly accepted riparian doctrine due to the transformation of the state economy from an agrarian economy to an industrial and mining economy. Recently there has been renewed public interest in the recreation and agricultural uses of the state's water resources as well as increased emphasis on pollution control. The enticement of industries to Alabama during the mid-1970's has rekindled interest in apportionment/allocation and further control of the state's water resources (State of Alabama, Alabama's Water Resources Policy, 1973, pp. 5-7).

c) Administration -- No institutional or administrative machinery has been developed to administer water use rights; though a 1971 statute regulates the drilling of wells, there is no limitation other than "reasonable use" for withdrawals. State courts are the forum for water use conflicts.

d) Comments -- The state averages more than 50 inches of rainfall annually but is plagued with drainage and pollution problems.

ALASKA

a) Doctrine -- Appropriation

b) History -- Alaska achieved statehood (the 49th) in 1958, and has many unique industrial features, all of which are dependent to some extent on water supply (fishing, mining, etc.). The principles of prior appropriation for both surface and subsurface waters were firmly established by the state constitution in 1966.

c) Administration -- The Division of Water, Alaska Department of Natural Resources, has the duty to adopt procedural and substantive regulations to administer the state's appropriation system.

d) Comments -- Though the average annual rainfall is 54 inches, the range of values extends from 150 inches to less than 6 inches; thus, some areas are subjected to substantial drought conditions while others have adequate precipitation. A comprehensive water code for regulation, adjudication and distribution of water resources was enacted in 1966.

ARIZONA

a) Doctrine -- Appropriation

b) History -- Although long before the mid-nineteenth century there existed a common law understanding of riparian water rights in Arizona, such rights were never adopted in the state except in the case of ground water. Early territorial legislation rejected the common law doctrine of riparian rights. In 1888 the Territorial Supreme Court decreed that the right to the use of surface water was to be governed by its appropriation for beneficial use; the State Legislature formally adopted the appropriation doctrine in 1913.

c) Administration -- Supervision and control is vested in the State Land Department. This same State Land Department may resolve conflicts of usage subject to judicial appeal.

d) Comments -- Substantial Indian Reserved Rights exist in Arizona. Currently, the State Legislature is considering several bills which would allow ground water to be removed from critical ground water basins and used for municipal and industrial requirements (Jacqueline Rich to James May, 18 April 1977).

ARKANSAS

a) Doctrine -- Riparian

b) History -- Arkansas has always been riparian; recent legislation gives the state some control over excess surface water (Ark. Stat. sec. 21-1301. Act. 81 of 1957 (ammendment)).

c) Administration -- Strictly judicial.

d) Comments -- The state makes no distinction between subsurface streams and percolating ground water. Yet, both the reasonable use and correlative rights doctrines govern the Arkansas landowner's right to the use of such waters.

CALIFORNIA

a) Doctrine -- Riparian and appropriation; it is further complicated by Pueblo water rights.[2]

b) History -- Riparian rights were the early common laws of California and, though many miners appropriated water, it was not until 1872 that the California Civil Code provided a formal procedure for acquiring appropriative water rights (Calif. Stats., Water Commission Act of 1913, c. 586). Following a 1926 case wherein the State Supreme Court upheld a riparian claim against that of an appropriator, the requirement for "reasonable, beneficial" use was added (Herminghaus v. So. Calif. Edison Co., 200 c. 81,252, p. 607). Subject to this limitation, riparian and appropriative rights have continued to exist concurrently.

c) Administration -- The California State Water Resources Control Board has strict statutory powers to adjudicate, regulate, and allocate water use rights in the state. Conflicts between common water right holders or between appropriation v. riparian rights are handled solely through the state courts.

d) Comments -- California is one of the states which adheres to correlative rights to ground water resources.

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[2]Pueblo water rights are established only in Los Angeles and San Diego. See Los Angeles v. Glendale, 23 C 2d 68, 142P 2d 289 (1943) and San Diego v. Cuyamaca Water Co., 209 C. 152 .287 p. 496 (1930).

COLORADO

a) Doctrine -- Appropriation

b) History -- The first state to adopt an exclusively appropriative system, Colorado claims to have never held to the riparian doctrine. In abrogating the doctrine of riparian rights, the Colorado doctrine took a much different stance than did California where two doctrines existed simultaneously.

c) Administration -- The State engineer has exclusive jurisdiction to administer, distribute, and regulate water uses. One district court judge is assigned to each of the state's seven water divisions; they are known as "water judges" and have exclusive jurisdiction over "water matters." Conflicts are normally settled by priority of claim; adjudications are common.

CONNECTICUT

a) Doctrine -- Riparian

b) History -- Water supply is not a serious problem in Connecticut and though the law is essentailly riparian, permits are required for well drillers and municipal users (Conn. Gen. Stat., sec. 25-127 and 25-131).

c) Administration -- No organizational structure exists. Private disputes are litigated in the courts.

d) Comments -- Connecticut's problems seem to be with pollution and in-stream environmental and conservation uses; the state has created agencies and legislative controls to deal with these conflicts.

DELEWARE

a) Doctrine -- Permit

b) History -- The law of Delaware prior to 1966 was riparian. Since that time, however, the status of riparian rights is unclear. The 1966 Act (Sec. 7-6101 et. seq.) effectively terminated all unused riparian rights as of 1 July of

that year and subsequently required permits to be issued for many new uses. There were, however, a substantial number of exemptions to that policy (57 Del. Laws, ch. 302, sec. 29-8001-8013).

c) Administration -- Riparian rights of the pre-1966 period were not administratively controlled. All water rights established after that date are administered by the Department of Natural Resources and Environmental Control (57 Del. Laws, ch. 302, sec. 29-8001).

FLORIDA

a) Doctrine -- Permit

b) History -- Florida originally adopted the riparian doctrine. However, the state has a curious mix of water problems resulting from seasonal heavy precipitation and extreme runoff causing concurrent abundances and severe shortages.[3] Salt water intrusion of wells along the coast is especially serious. The real problem in Florida was the lack of water management, particularly the much-utilized ground water resource.

Faced with a servere need for legislative answers and prodded by a disasterous drought in 1954-1956, the state wrote its famous Water Resources Act of 1972 (Fla. Laws 1972, ch. 72-299, Secs. 373.012 through 373.1962, supplemented in 1976 by sections 373.069 through 373.1965.). Perhaps the most striking aspect of the Act is the complete abolition of riparian rights and the requirement for all "previous" riparians to acquire a permit which has a set term of from 1 day to 20 years, renewable upon re-application.

c) Administration -- Prior to the 1972 Act, several attempts had been made at administering the state's water resources; each attempt had minimal effectiveness. Today, as a result of the 1972 Act, the Central and Southern Flood Control Districts have multi-purpose regulatory powers

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[3] Rainfall is not only distributed unevenly between areas in Florida but varies considerably within the same area both in total and even seasonal rainfall patterns. The state has experienced several serious droughts, including a very severe one which occurred between 1954 and 1956.

and the Department of Natural Resources both administers and supervises the 1972 Act with a very high degree of operational flexibility.

GEORGIA

a) Doctrine -- Riparian-Permit

b) History -- Georgia's riparian conflicts date back to the first half of the nineteenth century. In 1860, attempts were made to codify the laws of riparian rights, but the action was not priticularly helpful. Conflicts continued to increase especially between farmers and industrial and municipal users. The conflicts of these special interest groups prohibited alteration of the state laws during the 1955-1965 decade.

In 1972, both the Groundwater Use Act and the Georgia Water Quality Control Act were signed into law (17 Ga. Code Ann., secs. 17-1101 through 17-1114 (1972 supp.) and 6 Ga. L. Rev. 709 (1972). Ga. Laws 1964, p. 416, Ga. Code Ann., sec. 40-35104) (1972 supp.) and 8 Ga. St. Bar. 580, 589, note 55 (1972)). With the tremendous pressure of increasing demands weighing heavily on the state lawmakers, the current session of the Georgia House of Representatives (1976-1977) passed a "permit oriented" bill by a 128 to 35 vote with Senate approval expected. (Letter from Director, Georgia Dept. of Nat. Res. to James May, undated, Atlanta, Georgia.)[4] The bill is not explicit about existing or future riparian claims, but seems strongly aimed toward requirements for permits when withdrawals of surface waters are anticipated. Coupled with the 1972 Groundwater Use Act, Georgia water resource law is certain to become far more stable.

c) Administration -- Though surface water uses were not previously controlled, under the new Act, Georgia's Environmental Protection Division, Department of Natural Resources, will administer permits for withdrawals. Certain exceptions are to be made, but the courts will still resolve conflicts.

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[4]The new bill is intended to amend the "Georgia Water Quality Control Act, which was approved on 11 March 1964 (Ga. Laws 1964, p. 416). The law will provide a substantial degree of control over the issuance of water use permits.

d) Comments -- Georgia has some pollution problems, but they are relatively minor compared to surrounding states. Supply of water is oftentimes critical in summer months.

HAWAII

a) Doctrine -- Mixed, known as the Hawaiian System

b) History -- The Hawaiian System is a unique mix of traditional laws. Customs of the islands made the King owner of the land, water and all other natural resources. As development progressed, the King relinquished ownership of certain portions of his lands; with that ownership went the water. Today, the waters of a watercourse are essentially privately owned, and are not dedicated to the public (Codes, 1967, pp. 925-927).

c) Administration -- Though the Hawaii Board of Land and Natural Resources has been delegated certain limited authority, the courts normally provide final resolution of conflicting interests; a statutory procedure has existed for more than a century.

d) Comments -- While Hawaii's water laws are ancient, her status as a state is recent. Hawaii has never recognized the appropriation doctrine of most of the western states, prefering instead to adhere to several types of ancient, appurtenant, prescriptive and riparian rights. Hawaii has adopted a combination of reasonable use and correlative rights for ground water resources (Hutchins, 1946, pp. 172-177 and 187-190).

IDAHO

a) Doctrine -- Appropriation

b) History -- In 1881, the Idaho Territorial Legislature officially recognized the appropriation doctrine (Idaho Code sec. 42; 5 Idaho Law Review 21, 1968). The courts have consistently repudiated the riparian doctrine in all conflicts between the two concepts of water law (Malad Valley Dir. Co. v. Campbell, 2 Idaho 411, 18 Pac. 52 (1888); Drake v. Earhart, 2 Idaho 750, 23 Pac. 541 (1890); Jones v. McIntire, 60 Idaho 338, 91 P. 2d 373 (1939)). Ground water must also be appropriated.

c) Administration -- Statutory adjudication through the Idaho Department of Water Administration is designed to aid in defining and integrating various water rights.

ILLINOIS

a) Doctrine -- Riparian

b) History -- Illinois has substantial rainfall and a generally adequate water supply, though localized supply problems do exist. The critical nature of these problems has not attracted much attention from either the courts or the legislature (Dewsnup and Jensen, 1973, p. 277).

c) Administration -- Since water rights are incident to ownership of land abutting a stream, judicial review is the most common arena for resolving conflicts.

INDIANA

a) Doctrine -- Riparian-Permit

b) History -- Though essentially riparian, Indiana adopted limited administrative controls and regulations relating to the right to use surface and ground waters in 1955 (Burns Indiana Stat. Ann., sec. 27-1402). It appears that Indiana intends to implement additional regulation and control over the use of water in the future.

c) Administration -- Several statutory provisions for limited administrative controls have been enacted in Indiana and the Indiana Flood Control and Water Resources Commission has been given authority to arbitrate disputes between the users of surface waters prior to any final judicial settlement. Nevertheless, judicial review of rights remains the format for definition and general administration of individual water users.

IOWA

a) Doctrine -- Permit

b) History -- Iowa water rights prior to 1957 were strictly riparian. However, the state enacted a rather comprehensive permit statute in 1957, which applies to all water resources (25 Iowa Code Ann., ch. 455A). Permits are issued only for beneficial uses, but even the beneficial uses are subject to a "*minimum flow* clause" -- one of the first such clauses identified in any previously riparian state. It is unclear how much of a right previous riparians still have since there was no adjudication associated with the 1957 law, but the term aspect of the current statute does allow review on a "regular basis" not to exceed 10 years (Sec. 455A.20).

c) Administration -- The Iowa permit system only involves the administrative determination of the availability of unallocated water. The system does not provide for adjudication procedures and there are no statutory procedures within the state which provide for conflict resolution. The courts must resolve all conflicts on a case-by-case basis.

KANSAS

a) Doctrine -- Appropriation

b) History -- Riparian water rights were adopted by Kansas during the initial settlement and development of the state. The attempt of the Legislature to implement the appropriation doctrine in 1886 fell short of its goal; however, the Kansas Court did rule that it was not improper for both doctrines to co-exist. Not until 1945 did Kansas enact legislation which fully implemented the appropriation system as the exclusive method for acquiring water rights in the state.[5] Thus, all unallocated water is subject to appropriation while all prior rights -- whether appropriation or riparian -- are preserved and protected (Kan. Ann. Stat., secs. 82a - 701 to 82a - 725).

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[5]The 1945 legislation was prompted by State v. Kansas State Bd. of Ag., 158 Kan. 603, 149 P. 2d 604 (1944)).

c) Administration -- The State Engineer, Division of Water Resources, Board of Agriculture, is charged with the responsibility of administering the statutes governing the appropriation and distribution of the state's water resources. The engineer may adopt rules and regulations necessary to "control, conserve, regulate, allot and distribute..." (Sec. 82a - 706a.).

KENTUCKY

a) Doctrine -- Riparian-Permit

b) History -- Water supply did not present substantial problems during the early settlement of Kentucky. However, as the development of the states progressed, disputes over these water rights did arise. The Kentucky Court has never adopted any elements of the appropriation doctrine concerning either surface water or ground water. However, in 1966 legislation was enacted which provides for a limited state administrative control over the utilization and allocation of waters (Ky. Rev. Stat., secs. 151.100 to 151.990).

c) Administration -- A Division of Water was created within the Department of Natural Resources to administer the 1966 Act. Nonetheless, the development of Kentucky water law has evolved from judicial decisions; the judiciary is the exclusive institution for resolving conflicts.

d) Comments -- Though presently restricted to surplus waters, the Kentucky permit system has established itself through the 1966 Water Resources Act by declaring as its policy:

"...to encourage and provide financial support for water control and storage projects; to protect established rights and assure delivery of water to those having rights; to prohibit pollution; to prevent flooding; and to develop the state's ground water resources."

LOUISIANA

a) Doctrine -- Riparian

b) History -- To classify Louisiana as "riparian" is to oversimplify what appears to be a conglomeration of several aspects of riparian and appropriation doctrines. The state is

riparian in that water rights are normally acquired and used on land adjoining a water course, but appropriative in that the water is res communes (belonging to nobody in particular and which all men may freely use). The water and land may be separated from ownership but such a transaction must specifically state this occurance otherwise riparian ownership is assumed. Section 9:1101 of the revised state statutes reads "...waters of and in all bayous, streams, lagoons, lakes and bays and the beds thereof, not under direct ownership of any person as of August 12, 1910, are declared the property of the State." Nonetheless, Louisiana state law is substantially riparian.

c) Administration -- The State of Louisiana administers the majority of its water supplies for agriculture, domestic, municipal and industrial purposes through a wide variety of water supply districts or agencies. The rights are acquired by subscribing to water delivery service and paying established rates for water received.

d) Comments -- Article 661 of the Louisiana Civil Code establishes a riparian system of water rights. However, statutes authorizing the creation of public corporations having exclusive control over the distribution of water have eroded the importance of the system. In several of the agencies, even existing, vested riparian rights may not be taken without payment of just compensation. The Louisiana State Legislature set up a commission to study the state's water law system in 1964 and recently extended the life of the commission.

Possible legislation concerning water rights may occur in the near future; the state has specified a pro-industrial development in regards to its economic future (Letter from the office of the State Director of Public Works to James May, Baton Rouge, March 1977).

MAINE

a) Doctrine -- Riparian

b) History -- Maine adheres to the riparian doctrine.

c) Administration -- Water use conflicts are handled through judicial decision on a case-by-case basis.

d) Comments -- Riparian rights can be acquired through purchase of the water right, independent of the land itself. Rights may also be lost through prescription and adverse use.

MARYLAND

a) Doctrine -- Permit

b) History -- Maryland held the riparian doctrine as law until 1934 when the permit system was adopted (86 Md. Code Ann., art. 96A, secs. 1 through 22 (and 1971 supp.)). Separate provisions of the statute apply to:

1. permits for the right to use both surface and ground water;

2. permits for the construction of reservoirs, dams and waterway obstructions.

Several exceptions to the statute have diluted its effectiveness. Riparian rights in actual use on January 1, 1934 were preserved, and exempted from the permit requirement."Domestic" and "farm" uses are exempt, as are "municipal" water uses. Unused riparian rights were extinguished by implication.

c) Administration -- The Department of Water Resources which is a division of the Department of Natural Resources, administers the permit system.

d) Comments -- No case has come before the Maryland Court of Appeals on the constitutional grounds of the 1934 Act which extinguished unused riparian rights.

MASSACHUSETTS

a) Doctrine -- Riparian

b) History -- Massachusetts has upheld the reasonable use aspect of the riparian doctrine since The Massachusetts Bay Colony Ordinance of 1649.

c) Administration -- There is no state administrative agency or procedure governing the resolution of disputes over water use. Water use conflicts are resolved on a case-by-case basis through the courts.

d) Comments -- "Great ponds" of the state are public. Public use of any lake or pond covering more than 10 acres is a public right. A riparian right may be acquired separately from the land by deed or other instrument of convenience.

MICHIGAN

a) Doctrine -- Riparian

b) History -- Michigan has historically upheld the riparian doctrine of "reasonable use." The interpretation of this doctrine has also been in the forefront in recognition of environmental purposes such as recreation, fishing and wildlife refuge as well as the preservation of streams in their free-flowing state.

c) Administration -- There is no state administrative procedure governing the acquisition, distribution, or adjudication of water rights in Michigan; However, very limited efforts by the State Legislature operating through the Department of Natural Resources and the Water Resource Commission have given rise to state assumption of some responsibility concerning water use administration. Conflicts are handled privately or through judicial review.

d) Comments -- A recent pronouncement by the Michigan Supreme Court states that riparian rights are not alienable, severable, divisible, or assignable apart from riparian land which bounds the natural watercourse (Thompson v. Enz, 379 Mich. 667, 154 N.W. 2d 473 (1967)). The nature of the right is not related to the body of the stream or source itself, but rather a right to make reasonable use of this resource.

MINNESOTA

a) Doctrine -- Permit

b) History -- Following traditional common law riparianism from a very early date, Minnesota adopted a permit system in 1937 which was intended to compliment the existing system (9 Minn. Stat. Ann. secs. 105,37 to 105,55 (and 1971 supp.)). The Minnesota permit system provides limited state regulation and control by requiring permits to use the waters of the state.

c) Administration -- The Commissioner of Natural Resources has statutory responsibility for administering and controlling the use and allocation of water in Minnesota.

d) Comments -- The 1937 permit system was supposed to preserve riparian rights in existence on July 1, 1937. However, there is some concern as to whether the statute actually extinguishes unused riparian rights. Nonetheless, the statute does contain substantial revisions and ammendments (1947, 1965 and 1969) which have tended to revoke unused pre-1937 riparian rights. Perhaps the greatest insecurity of permits acquired under the Minnesota permit system is that every permit issued is subject to cancellation "...at any time if deemed necessary by the Commissioner for any cause for the protection of the public interest..." (see .105.44 (9)). Riparian rights may be transferred even to nonriparian owners.[6]

MISSISSIPPI

a) Doctrine -- Appropriation

b) History -- Apparently prompted by severe droughts in the early 1930's, Mississippi was the first of the eastern states to embrace the west's law of appropriation (5 Miss. Code Ann. secs. 5956-01 to -03 (1972 supp.)). The 1956 Water Code was indeed a contradiction to those surrounding states which still adhere to generally riparian concepts. Like many western states, certain riparian claims which existed prior to 1956 have been preserved, if indeed they were being used.

c) Administration -- The 1956 Water Resources Act (Sec. 5956-08) created a State Board of Water Commissioners and delegated to it the general administrative supervision of the surface waters of the state. The Board reviews all conflicts in water use prior to judgement in the State Supreme Court; it even has authority to enter into interstate compacts and agreements. Recognized riparian rights can be transferred without loss of

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[6] Early Minnesota cases held that these rights are not lost by a transfer to a nonriparian or by nonuse, but today such nonuse cases would be preempted by the permit system and a new right would require permit application.

the right and can normally be severed and transferred independently of the land itself. Ground water rights are riparian and therefore the owner of the soil retains such rights to the water beneath unless the water is in the form of a stream wherein the rights of use are governed by the same rules applicable to surface streams.

MISSOURI

a) Doctrine -- Riparian

b) History -- The riparian doctrine recognizes the normal riparian rights -- "...undiminished in quantity and unimpaired in quality, subject to reasonable use..." -- but the extent of the use permissible in Missouri has never been fully defined.

c) Administration -- No state agency has been delegated any responsibility for water administration. The definition and administration of various rights has been a matter for judicial decision.

d) Comments -- The state distinguishes between water which flows in a well-defined underground stream and percolating ground water. Reasonable use governs both.

MONTANA

a) Doctrine -- Appropriation

b) History -- Montana water rights were traditionally appropriated in accordance with the customs and rules of miners and settlers. In 1885, the State Legislature established a statutory procedure for appropriating water which was not unlike the procedure used by the miners, that was to post their claim and notice at the point of diversion. The procedure is not as crude today, but has basically the same effect. In 1921 a second *adjudication* was used and the courts became directly involved.

c) Administration -- In 1971, the responsibility for administration and for control of the use of private rights was assigned directly to the courts and court appointed water commissioners (Mont. L. sec. 89-103, repl. vol. 6 (pt. 1) R.C.M., 1947 (1971 supp.)). The Division of Water

Resources is involved in planning and may enter into agreements with other states or the Federal Government.

d) Comments -- Montana is the only appropriative state that uses a system of court appointed water commissioners. The acquisition of surface water rights is dependent upon the status of adjudication of the stream.

NEBRASKA

a) Doctrine -- Mixed

b) History -- The reluctance to accept appropriation as the exclusive system of water doctrine has a long history in Nebraska. Even though the right to divert water and apply it to beneficial use (appropriation) was implied as early as 1877, early decisions in the 1890's recognized the riparian system. In 1903 the state refused to make any complete substitution of the appropriation doctrine for the existing riparian doctrine (Meng v. Coffee, 67 Neb. 500,93 N.W. 713 (1903)). Holders of Federal land patents assumed that they had riparian rights. However, an 1889 Act (Neb. Comp. Stat. (1889), ch. 93a, art. I, sec. 1.) was passed with the intention of "chipping away at the common law right." In 1920 the court affirmed the existence of the appropriation system in Nebraska, but there was no evidence of intent to impair vested riparian rights acquired prior to 1895 (Neb. Comp. Stat. (1895), secs. 5440-5576). The Nebraska State Supreme Court decision in 1966 (Wasserburger v. Coffee, 180 Neb. 149, 141 N.W. 2d, 738) seemed to have finally substantiated that appropriation was the "law of the land" and that riparian claims were effective only for lands patented prior to 1895. But, in 1969, the State Supreme Court ruled in favor of a lower riparian owner. Though the state has long recognized appropriative rights it must be classified mixed due to this case (Brummond v. Vogel, 184, Neb. 415, 168 N.W. 2d 24, 1969).

c) Administration -- The Department of Water Resources has supervisory powers over all waters of the state and has approval authority over applications to appropriate or store water.

d) Comments -- Ground water users followed the rule of "reasonable use" until 1963. In that year the legislature adopted a permit type of ground water code (Neb. Rev. Stat. secs. 46-635 to 46-655.). Appropriators must secure a permit from the Department of Water Resources.

NEVADA

a) Doctrine -- Appropriation

b) History -- Most of the State of Nevada was carved out of the same territory as the State of Utah (Utah is one of five states professing to have always been appropriative). But, court rulings in Nevada have not upheld appropriative rights with any consistency. Significant decisions of the Nevada Supreme Court and the State Legislature are summarized as follows:

1866 -- Court applied the appropriation doctrine where parties based their claims on prior appropriation and beneficial use of the water (Labdell v. Simpson, 2 Nev. 274);

1872 -- Court stated that the common law doctrine of riparian rights was the law of Nevada and must prevail where the right to water was based on ownership of riparian land (Vansickle v. Haines, 7 Nev. 249);

1885 -- Nevada Supreme Court refused to acknowledge the riparian rights doctrine (Jones v. Adams, 19 Nev. 78, 6 Pac. 442);

1903-1905 -- The office of the State Engineer was created, though administrative powers do not come until 1905. "The law of appropriation stands today as the only method which will serve the wants and necessities of the people of the area." - Nevada Legislature (1905)

c) Administration -- The Office of the State Engineer, as established in 1905, handles all administrative aspects of water rights, allocation and adjudication.

NEW HAMPSHIRE

a) Doctrine -- Riparian

b) History -- Since its earliest existence, New Hampshire has recognized riparian rights as its basic water law; reasonable use of both surface and ground waters govern their development.

c) Administration -- New Hampshire has not established any state agency to administer water rights. Conflicts are resolved on a case-by-case basis through jucicial review.

NEW JERSEY

a) Doctrine -- Riparian-Permit

b) History -- Until 1963, New Jersey water law was exclusively riparian. In 1963, the state adopted a permit system to control the use of state waters (New Jersey stats. Ann. secs. 58:4A.).

c) Administration -- Permits issued by the Water Policy and Supply Council may not be enjoined; however, all other conflicts are a matter of judicial review.

d) Comments -- The New Jersey permit system is quite extensive, where applicable, covering both surface and subsurface waters. Riparian water rights may not be transferred to a non-riparian landowner (e.g. - a landowner whose holdings are not adjacent to the stream.).

NEW MEXICO

a) Doctrine -- Appropriation

b) History -- Established as a territory in 1850, the territorial supreme court ruled that the law of prior appropriation existed under the Mexican Republic at the time of New Mexico's acquisition and thus should be the law of the territory. The state has never recognized riparian law, but administers appropriations of water for "beneficial-reasonable" use. In 1907, the New Mexico Legislature established appropriation as the official law of the land and provided that all claims which were initiated prior to the date of the act would be accorded a priority date relating back to the initial claim (New Mexico Const., Act. XVI.).

c) Administration -- Strict statutory regulations govern the appropriations of New Mexico water; the State Engineer is the principal officer charged with the administration of water rights. The State Engineer also handles adjudication procedures.

d) Comments -- New Mexico, as with many appropriation states, has always used economic reasons to appropriate water from streams. This aspect has caused much friction with environmentalists who want the flows of watercourses to remain for their esthetic beauty or for recreational purposes or for the preservation of wildlife habitat. These "in-stream" uses have historically not held much weight. On 7 February 1977, the New Mexico legislature reviewed House Bill 228 which deals with this aspect of retaining certain flow in the streams for "uneconomic" uses. This is only one of several such bills to pass through the various State Legislatures.

NEW YORK

a) Doctrine -- Riparian

b) History -- New York has always held to a riparian doctrine of water rights. However, in the 1950's, because population growth had begun to generate increasing and often conflicting water needs for agriculture, industry, municipal supply, power production, recreation and waste disposal, and because water supply crises were created by droughts in the 1960's, it became clear that at least some of the existing uncertainties in New York water law could no longer be tolerated. Substantial water resource legislation exists among New York statutes, but only the opinions of the New York courts made any substantive efforts to define the contents. In 1966 the Environmental Conservation Law (Sec. 15-0701.) was enacted, marking the beginning of the elimination of many of the uncertainties which existed at the time of its passage. The 1966 Act imposed the reasonable use rule upon the state, but still lacks the ability to control or regulate such a rule. The City of New York does not even meter domestic water users.

c) Administration -- There are a number of water supply agencies controlled by the state. The controls consist of the allocations of certain quantities of water for specific uses.

d) Comments -- New York has held onto its riparian doctrine in spite of several hardships and conflicts over use.[9]

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[7]The majority of the section on New York was taken from the very explicit work of Farnham, 1974.

NORTH CAROLINA

a) Doctrine -- Permit

b) History -- North Carolina has recently strengthened its control over regulation of waters within the state. In 1951 a limited permit system was passed by the North Carolina Legislature (N.C. Gen. Stat. sec. 113-8.1 (1952)); the limitation of the system was that it pertained only to irrigation of agricultural lands. This control was feared lost when the act was repealed 10 years later, but the Water Use Act of 1967 (3C N.C. Gen. Stat. secs. 143-215.11 to .22 (1971 supp.)) requires permits under much broader circumstances. The 1967 Act preserves riparian rights in existence at the date of the Act.

c) Administration -- The North Carolina Board of Water and Air Resources was established by the 1967 Water Use Act; the powers of this Board have significantly increased adminsitrative control of water use. However, no administrative machinery exists to resolve disputes.

d) Comments -- The North Carolina permit system issues permanent authorizations. However, in the public interest, permits may be cancelled upon a 60-day notice, subject to the permittee's right to a hearing before the Board of Water and Air Resources and any appeal to the State Courts. (Aycock, 1967, pp. 1-38.)

NORTH DAKOTA

a) Doctrine -- Appropriation

b) History -- Riparian rights were the first to be declared law in the state of North Dakota. Early court decisions applied the riparian doctrine to surface streams. In 1866 the territorial legislature adopted an absolute ownership rule to subsurface water. Not until 1905, did North Dakota enact a water code (N.D. Laws, ch. 34.) making all water in the state public and subject to appropriation for beneficial use. Riparian claims were honored after the 1905 Act if their use was reasonable. A 1963 statute (N.D. Laws, Sec. 61-04-22 to 26 (1971 supp.)) repealed all absolute ownership claims (from 1866 as stated above), and considered unused riparian claims abandoned. The 1963 statute requires even riparian claimants to submit requests for permits, so essentially the entire state now adheres to the appropriation doctrine.

c) Administration -- The North Dakota Water Conservation Commission and the State Engineer divide administrative duties pertaining to water rights. The State Engineer has initial authority to act upon all permit applications to include resolution of water use claims and conflicts through statutory adjudication procedures. The State Water Conservation Commission has responsibilities regarding the distribution of water as well as inspection of regulation devices.

OHIO

a) Doctrine -- Riparian

b) History -- Ohio's abundant water supply has necessitated little attention in either the courts or the legislature. The riparian doctrine of reasonable use normally governs court decisions.

c) Administration -- Ohio has no statutory procedure governing acquisition, distribution or transfer of water rights.

d) Comments -- Water rights are normally transferred with the sale of land though the land and water may be separated and sold separately.

OKLAHOMA

a) Doctrine -- Mixed

b) History -- Both riparian and appropriation water rights are recognized in Oklahoma and have been since the early 1900's. In 1890, a territorial statute (Terr. Okla. Stat. sec. 4162) encompassed the natural flow rule of riparian rights, but seven years later a basic appropriation statute was enacted (Laws Terr. Okla. Ch. 19, art. 1, pp. 187-195). The state is basically appropriative but conflicts do occur between users claiming rights based on both doctrines. In 1963, ammendments to the 1890 and 1897 statutes were intended to bring about some reconciliation of the riparian and appropriation systems (Okla. Rev. Laws, secs. 105.1 et req.). Riparian claims are only recognized for pre-1963 beneficial uses and for domestic uses; all riparian uses prior to 1963 are protected by a system of priorities established by the 1963 Act. Unused riparian claims are not recognized.

c) Administration -- The Oklahoma Water Resources Board has been delegated the responsibility of developing a state water plan and to adopt statutory procedures to provide administrative control and regulation of waters within the state. Statutory adjudication of a waterway must include the district court representation if the Water Resources Board considers the conflict to involve the public interest.

d) Comments -- The Oklahoma State Legislature enacted a new Ground Water Act in 1972; it became law on July 1, 1973. With this Act, the state ground water laws have undergone the transition from a common law riparian system, through an appropriation system in 1949, to the present system of exclusive appropriation with surveys required to determine the maximum yield for each ground water basin and permits required even for domestic uses of the water. This law is quite possibly the most comprehensive statute for ground water use in the country (Oklahoma Comprehensive Water Plan, 1 September 1975).

OREGON

a) Doctrine -- Appropriation

b) History -- Throughout its earliest history Oregon adhered to the riparian doctrine of natural flow. Following Congressional legislation such as the Desert Land Act of 1877 (Ch. 107, U.S.C., 19 Stat. 377), and others during the 1860-1877 period (Mining Act of 1866 and homestead Act of 1872), Oregon law underwent extensive changes in the riparian doctrine and began to construe the Act of 1877 as a mandate to recognize preexisting rights acquired by prior appropriation and to honor the appropriation of water in contravention of the riparian doctrine. In 1909, the Oregon Legislature rejected the doctrine of riparian rights and implemented the appropriation doctrine as the exclusive method of acquiring water rights, providing, of course, for the protection of existing vested rights limited to the quantity of water which was being beneficially used at the time the act was passed (Oregon Rev. Stat., secs. 537.010 to .990).

c) Administration -- The Oregon State Engineer has the delegated responsibility for administration of statutory controls over appropriation adjudication and distribution of water rights.

PENNSYLVANIA

a) Doctrine -- Riparian

b) History -- Pennsylvania has held onto its riparian doctrine throughout extensive litigation of conflicts resulting from the diversified agricultural, mining and manufacturing demands. Subterranean streams are governed by riparian resonable use rules, but percolating ground water adheres to the common law riparian rule of "absolute ownership."

c) Administration -- Water use conflicts must be resolved in the courts. Certain quality and navigational uses often have imposed regulations governing them.

d) Comments -- A permit system has been established to control certain public uses and power supply agencies and to balance water uses where and when conservation is required (32 Pa. Stat. Ann. (1967)). Pennsylvania riparians do not have the right to separate the water from their land for the purpose of sale.

RHODE ISLAND

a) Doctrine -- Riparian

b) History -- No comprehensive body of water law has been developed in Rhode Island due to the few conflicts and limited requirements for judicial or legislative resolution. The rule of reasonable use governs conflicts in apportionment of the available water supply.

c) Administration -- Conflicting claims to the right to use water are settled by the courts on a case-by-case basis.

SOUTH CAROLINA

a) Doctrine -- Riparian

b) History -- Riparian water rights have been recognized in South Carolina since 1835. In the mid-1950's, however, the system of prior appropriation was submitted in a proposal to the general assembly by the state water policy committee; the measure was defeated. In 1969, a statute was enacted (S.C. Code, secs. 70-31 to 70-42.) restricting

the use of ground water and requiring a permit for diversions in excess of 100,000 gallons per day. To date, this is the only significant modification to the generally accepted riparian doctrine and it does not alter surface water rights in any way.

c) Administration -- There is no administrative agency to resolve conflicts over water uses. The courts are the normal arena for such disputes. However, the 1967 establishment of the South Carolina Water Resources Planning and Coordinating Commission was a significant step in water resource planning.

d) Comments -- The mid-1950's activity away from riparianism and toward appropriation is an apparent indication of the state's concern with its water resources, but there has been no significant extension of that activity.

SOUTH DAKOTA

a) Doctrine -- Appropriation

b) History -- South Dakota's efforts to enact an appropriation doctrine should be described as persistent. In 1866 the territorial legislature recognized the riparian "natural flow" rule for establishing surface water rights. Recognizing that appropriative rights would better serve the needs of the state, in 1907, the legislature enacted a comprehensive statute adopting appropriation for beneficial use (S.D. Laws, 1907, ch. 180). Rejecting the statute as unconstitutional in 1913, the state supreme court based its decree on the grounds of unlawful infringement on vested riparian rights. The struggle continued until 1955 when the legislature, taking care to protect valid riparian claims, enacted an effective statute establishing appropriation as the exclusive law of the state.[8]

c) Administration -- General supervision, measurement, appropriation and distribution of state waters and the statutory

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[8]The 1955 act was based on statutes in Kansas and Oregon. The S.D. Water Code was ammended and sections rearranged in 1960; pertinent provisions are now found in 13 S.D. Comp. Laws Ann., 1967, secs. 46-1-1, 46-2-1 to 13, 46-5-1 to 46 and 46-6-1 to 23. Later sections were again amended in 1970.

requirement for application approval are the duties of the State Water Resources Commission which was created by the 1955 Appropriation Act.

d) Comments -- While recognizing "vested rights" prior to 1955, the water Appropriation Act of 1955 does include ground water.

TENNESSEE

a) Doctrine -- Riparian

b) History -- No substantial legislation or litigation exists in Tennessee; conflicts have not occupied any significant position in the Tennessee courts (Dewsnup and Jensen, 1973, pp. 689-698). The reasonable use rule is normally considered in the settlement of disputes.

c) Administration -- The state is basically without administrative control of water rights. However, the director of the Department of Conservation was designated as the Water Engineer a few years ago; he has the responsibility of conservation protection and development of the water resources of the state.

d) Comments -- Percolating ground waters are governed by the doctrine of correlative rights.

TEXAS

a) Doctrine -- Mixed

b) History -- Texas water law is perhaps the most complex of all state laws, with the possible exception of California. Prior to 1840 the acknowledgement of Spanish and Mexican laws continued to exist, but in 1840 the Republic of Texas adopted the common law of England (basically riparian) as the "rule of decision" in Texas. This law continued until the Irrigation Act of 1809 (Texas Gen. Laws, 1889, ch. 88, p. 100.) which introduced the appropriation system to the arid portions of Texas only. Then, the Burgess-Classcock Act of 1913 (Texas Gen. Laws, 1913, ch. 191, p. 358.) repealed the 1889 act, and established the first statewide application of the appropriation doctrine. The Canales Act of 1917

(Texas Gen. Laws, 1917, ch. 88, p. 211.) revised and expanded the 1913 act and instituted a permit system which has remained the basic Texas water law of today. This 1917 legislation has been modified several times over the years with the only effect being to strenghten its intent.

c) Administration -- The "permit system" as established in the early 1900's is the accepted system in Texas today, though substantial riparian claims do exist from the mid-nineteenth century.

UTAH

a) Doctrine -- Appropriation

b) History -- Even though the early Mormon pioneers carried with them the basic concepts of Anglo-Saxon riparianism, both the territorial supreme court and later the Utah Supreme Court ruled that riparianism never constituted a part of Utah water law. The Utah constitution has confirmed that water of the state, whether above or below the ground, is the property of the public and is subject to appropriation (Utah Const., Art. XVII, sec. 1.).

c) Administration -- The office of the State Engineer was created in 1897. His duties have expanded over the years to include measurement, distribution, all matters involving the appropriation of water and providing assistance to the district court when statutory adjudication of water rights is needed to resolve conflicts (the principal method of resolving water conflicts in Utah).

d) Comments -- Ground water in Utah has experienced a quite different history. Percolating ground water has undergone the transition from riparian through correlative rights and eventually appropriation. Now, all waters of the state are subject to appropriation.

VERMONT

a) Doctrine -- Riparian

b) History -- The legislative history of water resource law in Vermont is extremely limited. The Vermont Supreme Court has

consistently applied the doctrine of riparian rights, allowing each riparian owner to make reasonable use of the water in the watercourse.

c) Administration -- Vermont has no administrative agency to handle the acquisition, administration, distribution, or transfer of water rights. Resolution of conflicts is handled by the courts on a case-by-case basis.

d) Comments -- Riparian water rights may be transferred separately from the land, or the owner may transfer a qualified right.[9]

VIRGINIA

a) Doctrine -- Riparian

b) History -- Virginia has historically held that reasonable use of one's riparian water rights is the law of the state. Nonetheless, the state has also recognized the need to regulate many of its waterways and certain regulations do exist regarding navigation, fisheries and flood control.

At this time the state is considering the enactment of a permit system for the administration of water rights. House Joint Resolution No. 175, 13 January 1977, is now in the hands of the Virginia Legislature with a reasonable chance that the state will adopt a permit system by the end of the present session.

c) Administration -- Virginia presently has no administrative or organizational structure to resolve conflicts between riparian users. Disputes are resolved by the courts on a case-by-case basis.

d) Comments -- Note should again be made that the state appears to be on the brink of adoption of a permit system and that the obvious appurtenances of such a system are inevitable. Administration of such a permit system will certainly become a sub-division of the State Water Control Board.

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[9] A qualified right is one where the original owner retains certain specified rights to the water use. He does, indeed, transfer some of his rights.

WASHINGTON

a) Doctrine -- Mixed

b) History -- The Cascade Mountain Range separates the eastern and western parts of Washington into two distinct physiographic areas. The western portion of the state is very humid, while the eastern portion is very arid. Thus, it is not surprising that Washington has adopted both the riparian and the appropriation systems of water rights. Appropriations were allowed during the state's early development although water rights were riparian. In 1917 the state adopted the appropriation doctrine as the exclusive means of acquiring the right to use surplus waters (Wash. Rev. Code, sec. 90.03.010.). The appropriation of ground water became law in 1945 (Wash. Rev. Code, secs. 90.44.010 to 90.44.250.).

c) Administration -- Recently, Washington's procedure has been equivalent to that of most other western states. Appropriation, adjudication and distribution of water was administered through the Department of Water Resources. The Department of Ecology was created in 1970 (Wash. Rev. Code, sec. 43.21A.060 and sec. 43.21A.300.) to inherit the regulatory requirements of the Department of Water Resources. This move may become a significant step toward the achievement of a coordinated water resource management program.

d) Comments -- It is interesting to note that the intended exportation of Columbia River water to the Colorado River Basin which was a serious issue in the late 1960's and which was tabled by the U.S. Supreme Court for 10 years, will soon become a paramount concern of the people in the northwest. The range of variation between eastern and western Washington is 80 inches of precipitation: the west with an annual average rainfall of 100 inches, the east with less than 20.

WEST VIRGINIA

a) Doctrine -- Riparian

b) History -- Throughout its history, West Virginia has upheld the reasonable use rule of the riparian doctrine. The limited legislation pertaining to water laws has involved the disposition of excess water rather than conflicts over the use of existing supplies.

c) Administration -- West Virginia has a Division of Water Resources and a Water Resources Board which have certain responsibilities for water development, management and planning. However, judicial decision has been the only format for resolution of conflicts between the individual rights of water users.

d) Comments -- Riparian water rights may not be sold separately from the land which is adjacent to the water nor may any such rights be transferred to a non-riparian.

WISCONSIN

a) Doctrine -- Riparian-Permit

b) History -- Several Wisconsin cases mention a "natural flow" theory; however, the state now seems to be committed to the "reasonable use" theory. Riparian rights were limited by a few water permit statutes as of August 1957 when the State Legislature required such permits for agricultural and irrigation uses (Wis. Stat. Ann. secs. 144.02 to 144.03).

c) Administration -- Any regulatory functions involving water rights in Wisconsin are handled by a new Department of Natural Resources. Permits are also issued from this office. However, the state courts must resolve disputes between individual claimants. The most extreme application of the English system of absolute ownership of ground water may be encountered in Wisconsin. All attempts to revise and broaden the interpretation have failed.

WYOMING

a) Doctrine -- Appropriation

b) History -- Riparian water rights have apparently never been recognized in Wyoming. The Wyoming Territorial Legislature recognized the right to appropriate as early as 1869 (Wyo. Laws 1869, ch. 8, secs. 28,29 ch. 22, secs. 15 to 18.). The basis of the present system is the Wyoming Constitution which declared appropriation as the exclusive law of the state in 1890 (Wyo. Const., art. VIII, secs. 1-5.).

c) Administration -- The administrative burdens of water rights are shared by two agencies in the state of Wyoming. The State Engineer is the president of the Board of Control but acts independently of the Board with the superintendents of the four state water divisions. The Engineer is mandated to supervise the waters of the state by regulations to govern forms and procedures for applicants. However, once the application for appropriation has been perfected, the Board issues the certificate of appropriation. Statutory adjudication of water rights is the normal procedure used to determine the extent of existing rights. The Board of Control carries out such adjudication in corrdination with the Wyoming Supreme Court.

APPENDIX C

Summary of Current (1977) State Water Doctrines

State	Notes	Surface Water	Ground Water
1. Alabama	1,2	Riparian	Reasonable Use
2. Alaska	3	Appropriation	Appropriation
3. Arizona	3	Appropriation	Reasonable Use
4. Arkansas	2	Riparian	Reasonable Use & Correlative Rights
5. California	2,4	Mixed	Correlative Rights
6. Colorado	3	Appropriation	Appropriation
7. Connecticut	2	Riparian	Common Law Riparian
8. Delaware	5	Permit	Reasonable Use
9. Florida	5	Permit	Permit
10. Georgia	5,6	Riparian-Permit	Reasonable Use
11. Hawaii	5	Mixed	Correlative Rights & Reasonable Use
12. Idaho	3	Appropriation	Appropriation
13. Illinois	2	Riparian	Reasonable Use
14. Indiana	2	Riparian-Permit	Common Law Riparian
15. Iowa	5	Permit	Reasonable Use
16. Kansas	7	Appropriation	Appropriation
17. Kentucky	2	Riparian-Permit	Reasonable Use
18. Louisiana	1,2	Riparian	Common Law Riparian
19. Maine	2	Riparian	Common Law Riparian
20. Maryland	5	Permit	Permit
21. Massachusetts	2	Riparian	Common Law Riparian
22. Michigan	2	Riparian	Reasonable Use
23. Minnesota	2,5	Permit	Permit
24. Mississippi	3,5	Appropriation	Common Law Riparian
25. Missouri	2,5	Riparian	Reasonable Use
26. Montana	3	Appropriation	Appropriation

State	Notes	Surface Water	Ground Water
27. Nebraska	5	Mixed	Permit
28. Nevada	3	Appropriation	Appropriation
29. New Hampshire	2	Riparian	Reasonable Use
30. New Jersey	2	Riparian-Permit	Reasonable Use
31. New Mexico	3	Appropriation	Appropriation
32. New York	2,5	Riparian	Reasonable Use
33. North Carolina	5	Permit	Reasonable Use
34. North Dakota	3	Appropriation	Appropriation
35. Ohio	2	Riparian	Common Law Riparian
36. Oklahoma	1,3	Mixed	Appropriation
37. Oregon	3	Appropriation	Appropriation
38. Pennsylvania	2	Riparian	Common Law Riparian
39. Rhode Island	2	Riparian	Common Law Riparian
40. South Carolina	2	Riparian	Common Law Riparian
41. South Dakota	3	Appropriation	Appropriation
42. Tennessee	2	Riparian	Reasonable Use
43. Texas	5	Mixed	Common Law Riparian
44. Utah	3	Appropriation	Appropriation
45. Vermont	2	Riparian	Common Law Riparian
46. Virginia	2	Riparian	Reasonable Use
47. Washington	5	Mixed	Appropriation
48. West Virginia	2	Riparian	Reasonable Use
49. Wisconsin	2,5	Riparian-Permit	Common Law Riparian
50. Wyoming	3	Appropriation	Appropriation

1. Natural flow as a basis for judicial review.

2. Reasonable use as a basis for judicial review.

3. Prior appropriation for beneficial use as the basis for judicial review.

4. Further complicated by Pueblo water rights.

5. See Appendix B for explanation.

6. The Georgia House of Representatives in the current session (1977) passed a "permit" oriented bill by a 128 to 35 vote and expects the State Senate to pass the bill by an equally proportional margin. The interpretation of the new bill as to keeping to the riparian doctrine is unclear; nonetheless, the requirement for a permit is clear. The state is therefore classified as riparian-permit in anticipation of concurrance of both state houses.

7. Both appropriative and riparian water rights exist in Kansas. The two rights are recognized by the state courts, but as of 1945 all new rights are appropriative.

APPENDIX D

Dates of Changes in State Water Laws[1]

State	Date of Change	From	To
1. Alabama[1]			Appropriation
2. Alaska[2]	1966		Appropriation
3. Arizona[3]	1888	Riparian	Appropriation
4. Arkansas[1]			
5. California[4]	1872	Riparian	Mixed
6. Colorado[1]			
7. Connecticut[1]			
8. Delaware	1966	Riparian	Permit
9. Florida	1972	Riparian	Permit
10. Georgia[5]	1977	Riparian	Riparian-Permit
11. Hawaii[1]			
12. Idaho	1881	Riparian	Appropriation
13. Illinois[1]			
14. Indiana	1951	Riparian	Riparian-Permit
15. Iowa	1957	Riparian	Permit
16. Kansas	1945	Riparian	Appropriation
17. Kentucky	1966	Riparian	Riparian-Permit
18. Louisiana[1]			
19. Maine[1]			
20. Maryland	1934	Riparian	Permit
21. Massachusetts[1]			
22. Michigan[1]			
23. Minnesota	1937	Riparian	Permit
24. Mississippi	1957	Riparian	Appropriation
25. Missouri[1]			
26. Montana[1]	1885		Appropriation
27. Nebraska[6]	1877	Riparian	Partial-Appropriation
	1889		Further-Appropriation
	1895		Appropriation
	1969	Appropriation	Mixed

State	Date of Change	From	To
28. Nevada	1872	Appropriation	Riparian
29. New Hampshire[1]			
30. New Jersey	1963	Riparian	Riparian-Permit
31. New Mexico[1]	1907		Appropriation
32. New York[1]			
33. North Carolina	1951	Riparian	Riparian-Permit
34. North Dakota	1905	Riparian	Appropriation
35. Ohio[1]			
36. Oklahoma	1897	Riparian	Mixed
37. Oregon	1909	Riparian	Appropriation
38. Pennsylvania[1]			
39. Rhode Island[1]			
40. South Carolina[1]			
41. South Dakota[7]	1907	Riparian	Appropriation
	1913	Appropriation	Riparian
	1970	Riparian	Appropriation
42. Tennessee[1]			
43. Texas[1]	1889	Riparian	Mixed
44. Utah[1]			
45. Vermont[1]			
46. Virginia[8]			
47. Washington	1917	Mixed	Appropriation
48. West Virginia[1]			
49. Wisconsin	1957	Riparian	Riparian-Permit
50. Wyoming[1]			

1. Reference to Appendices B and C is appropriate. Several states have either never recongized any doctrine other than the one which presently exists (Colorado, Montana, New Mexico, Utah, Wyoming) or have rejected common law practices of the region in order to adhere to a particular law. Still other states recognize water rights which are unique only to their historical background (Hawaii and Texas).

2. Alaska's incorporation as a state in 1959 did not include appropriative water rights until the acceptance of the State Constitution in 1966.

3. Arizona did not specifically adopt riparian law and later reject it for appropriation law. It did, however, officially reject the riparian concept in 1888.

4. Confused by several types of water rights, California officially accepted a mixed system, recognizing no one concept as superior, in 1872.

5. The Georgia House, in a 4 to 1 vote, passed a statute making Georgia water law "permit" in nature in the present 1976-1977 session. Approval in the State Senate, expected by the same majority is anticipated.

6. Nebraska's conversion to appropriation was step-by-step; certain areas adopted the appropriation doctrine before others.

7. South Dakota's reversal to the riparian doctrine was due to a State Supreme Court declaration that the 1907 law was unconstitutional. Passage of a new statute was not finally approved until 1970.

8. Reference to Appendix B will substantiate that Virginia's intentions toward further control of the water resources is indeed active and that one should look for, though not necessarily expect, a change in the near future.

APPENDIX E

PROVISIONAL ESTIMATES OF THE RESIDENT POPULATION OF STATES, JULY 1, 1976, AND COMPONENTS OF POPULATION CHANGE SINCE APRIL 1, 1970

Resident population includes estimated Armed Forces personnel residing in each State. See text for statement on rounding]

Region, division, and State	July 1, 1976 (provisional)	July 1, 1975	April 1, 1970[1] (census)	Change, 1970 to 1976		Components of change			
				Number	Percent[2]	Births	Deaths	Net migration	
								Number	Percent[2]
United States, total	[3]214,659,000	213,032,000	203,304,863	11,354,000	5.6	20,610,000	12,113,000	2,857,000	1.4
REGIONS:									
Northeast	49,503,000	49,456,000	49,060,514	443,000	0.9	4,282,000	3,046,000	-793,000	-1.6
North Central	57,739,000	57,636,000	56,593,024	1,146,000	2.0	5,653,000	3,369,000	-1,139,000	-2.0
South	68,855,000	68,041,000	62,813,082	6,042,000	9.6	6,944,000	3,841,000	2,939,000	4.7
West	38,562,000	37,899,000	34,838,243	3,724,000	10.7	3,732,000	1,857,000	1,849,000	5.3
NORTHEAST:									
New England	12,221,000	12,187,000	11,847,245	374,000	3.2	1,031,000	715,000	59,000	0.5
Middle Atlantic	37,282,000	37,269,000	37,213,269	69,000	0.2	3,251,000	2,331,000	-851,000	-2.3
NORTH CENTRAL:									
East North Central	40,934,000	40,945,000	40,265,477	668,000	1.7	4,074,000	2,345,000	-1,060,000	-2.6
West North Central	16,805,000	16,690,000	16,327,547	478,000	2.9	1,579,000	1,023,000	-78,000	-0.5
SOUTH:									
South Atlantic	33,990,000	33,658,000	30,678,948	3,311,000	10.8	3,233,000	1,893,000	1,970,000	6.4
East South Central	13,661,000	13,515,000	12,808,077	853,000	6.7	1,434,000	816,000	235,000	1.8
West South Central	21,204,000	20,867,000	19,326,057	1,878,000	9.7	2,277,000	1,133,000	734,000	3.8
WEST:									
Mountain	9,833,000	9,625,000	8,289,901	1,543,000	18.6	1,067,000	438,000	913,000	11.0
Pacific	28,729,000	28,274,000	26,548,342	2,181,000	8.2	2,665,000	1,419,000	935,000	3.5
NEW ENGLAND:									
Maine	1,070,000	1,058,000	993,722	76,000	7.7	101,000	67,000	42,000	4.3
New Hampshire	822,000	812,000	737,681	85,000	11.5	75,000	47,000	56,000	7.6
Vermont	476,000	472,000	444,732	32,000	7.1	45,000	27,000	14,000	3.1
Massachusetts	5,809,000	5,814,000	5,689,170	120,000	2.1	478,000	352,000	-7,000	-0.1
Rhode Island	927,000	931,000	949,723	-23,000	-2.4	80,000	58,000	-45,000	-4.7
Connecticut	3,117,000	3,100,000	3,032,217	85,000	2.8	251,000	164,000	-2,000	-0.1
MIDDLE ATLANTIC:									
New York	18,084,000	18,076,000	18,241,398	-158,000	-0.9	1,608,000	1,126,000	-640,000	-3.5
New Jersey	7,336,000	7,333,000	7,171,112	165,000	2.3	626,000	423,000	-38,000	-0.5
Pennsylvania	11,862,000	11,860,000	11,800,766	61,000	0.5	1,017,000	782,000	-173,000	-1.5
EAST NORTH CENTRAL:									
Ohio	10,690,000	10,735,000	10,657,423	32,000	0.3	1,067,000	624,000	-411,000	-3.9
Indiana	5,302,000	5,313,000	5,195,610	106,000	2.0	548,000	304,000	-138,000	-2.7
Illinois	11,229,000	11,197,000	11,112,797	116,000	1.0	1,119,000	679,000	-324,000	-2.9
Michigan	9,104,000	9,111,000	8,881,826	222,000	2.5	918,000	482,000	-214,000	-2.4
Wisconsin	4,609,000	4,589,000	4,417,821	191,000	4.3	421,000	256,000	27,000	0.5
WEST NORTH CENTRAL:									
Minnesota	3,965,000	3,921,000	3,806,103	159,000	4.2	365,000	212,000	5,000	0.1
Iowa	2,870,000	2,861,000	2,825,368	44,000	1.6	264,000	182,000	-37,000	-1.3
Missouri	4,778,000	4,767,000	4,677,623	101,000	2.2	452,000	319,000	-32,000	-0.7
North Dakota	643,000	637,000	617,792	26,000	4.1	64,000	35,000	-4,000	-0.6
South Dakota	686,000	681,000	666,257	20,000	3.0	70,000	42,000	-9,000	-1.3
Nebraska	1,553,000	1,544,000	1,485,333	68,000	4.5	150,000	94,000	11,000	0.8
Kansas	2,310,000	2,280,000	2,249,071	61,000	2.7	213,000	139,000	-13,000	-0.6
SOUTH ATLANTIC:									
Delaware	582,000	579,000	548,104	34,000	6.2	56,000	31,000	9,000	1.6
Maryland	4,144,000	4,122,000	3,923,897	221,000	5.6	360,000	205,000	65,000	1.7
District of Columbia	702,000	712,000	756,668	-55,000	-7.3	73,000	51,000	-77,000	-10.2
Virginia	5,032,000	4,981,000	4,651,448	381,000	8.2	472,000	253,000	162,000	3.5
West Virginia	1,821,000	1,799,000	1,744,237	77,000	4.4	180,000	124,000	21,000	1.2
North Carolina	5,469,000	5,441,000	5,084,411	385,000	7.6	550,000	289,000	124,000	2.4
South Carolina	2,848,000	2,816,000	2,590,835	257,000	9.9	310,000	149,000	97,000	3.8
Georgia	4,970,000	4,931,000	4,587,930	382,000	8.3	543,000	266,000	105,000	2.3
Florida	8,421,000	8,277,000	6,791,418	1,629,000	24.0	690,000	525,000	1,464,000	21.6
EAST SOUTH CENTRAL:									
Kentucky	3,428,000	3,387,000	3,220,711	207,000	6.4	351,000	211,000	67,000	2.1
Tennessee	4,214,000	4,173,000	3,926,018	288,000	7.3	413,000	244,000	119,000	3.0
Alabama	3,665,000	3,615,000	3,444,354	221,000	6.4	385,000	215,000	50,000	1.5
Mississippi	2,354,000	2,341,000	2,216,994	137,000	6.2	284,000	146,000	-1,000	(Z)
WEST SOUTH CENTRAL:									
Arkansas	2,109,000	2,110,000	1,923,322	186,000	9.7	216,000	136,000	106,000	5.5
Louisiana	3,841,000	3,806,000	3,644,637	196,000	5.4	432,000	212,000	-23,000	-0.6
Oklahoma	2,766,000	2,715,000	2,559,463	207,000	8.1	269,000	169,000	107,000	4.2
Texas	12,487,000	12,237,000	11,198,635	1,288,000	11.5	1,361,000	616,000	543,000	4.9
MOUNTAIN:									
Montana	753,000	746,000	694,409	58,000	8.4	75,000	42,000	25,000	3.7
Idaho	831,000	813,000	713,015	118,000	16.5	94,000	40,000	64,000	8.9
Wyoming	390,000	376,000	332,416	58,000	17.4	40,000	19,000	37,000	11.1
Colorado	2,583,000	2,541,000	2,209,596	373,000	16.9	248,000	112,000	237,000	10.7
New Mexico	1,168,000	1,144,000	1,017,055	151,000	14.9	133,000	49,000	67,000	6.6
Arizona	2,270,000	2,212,000	1,775,399	495,000	27.9	241,000	102,000	356,000	20.1
Utah	1,228,000	1,203,000	1,059,273	169,000	15.9	180,000	46,000	35,000	3.3
Nevada	610,000	590,000	488,738	121,000	24.8	57,000	26,000	91,000	18.5
PACIFIC:									
Washington	3,612,000	3,559,000	3,413,244	199,000	5.8	323,000	189,000	64,000	1.9
Oregon	2,329,000	2,284,000	2,091,533	237,000	11.3	205,000	127,000	159,000	7.6
California	21,520,000	21,198,000	19,971,069	1,549,000	7.8	1,994,000	1,068,000	623,000	3.1
Alaska	382,000	365,000	302,583	79,000	26.3	45,000	9,000	44,000	14.5
Hawaii	887,000	868,000	769,913	117,000	15.2	98,000	26,000	45,000	5.9

Z Less than 0.05 percent.

[1] Includes officially recognized changes to census counts through November 1976. The official 1970 census counts used in apportionment are shown in 1970 Census of the Population, Volume I, Characteristics of the Population, Part A, Number of Inhabitants, p. VIII.

[2] Percent of April 1, 1970 population.

[3] The resident population estimate for July 1, 1976, differs slightly from that published in Series P-25, No. 641 because of updated military statistics. The civilian estimates are consistent with that report.

APPENDIX F

Southern Population Growth 1920-2020 (Values in thousands)*

State	1920	1930	1940	1950	1960	1970	1976	2000	2020
Virginia	2309	2422	2678	3319	3967	4652	5032	6415	7225
North Carolina	2559	3170	3572	4062	4556	5084	5469	6873	7660
South Carolina	1684	1739	1900	2117	2383	2591	2848	3537	3864
Georgia	2896	2909	3124	3445	3943	4588	4970	6458	7491
Florida	968	1468	1897	2771	4952	6791	8421.0	14,582	18,888
Mississippi	1791	2010	2184	2179	2178	2217	2354.0	2679	2825
Alabama	2348	2646	2833	3062	3267	3444	3665.0	4284	4650
Louisiana	1799	2102	2364	2684	3257	3645	3841.0	4380	5442
Arkansas	1752	1854	1949	1910	1786	1923	2109.0	2405	2988
Tennessee	2338	2617	2916	3292	3567	3926	4214.0	5444	6075
	20,444	22,937	25,417	28,841	33,856	38,861	42,423	57,057	67,108

*Values in this Appendix are based on U.S. Census Bureau data Statistical Abstract of the U.S. - 1976 and News Release, 9 Jan. '77; projections made by the U.S. Department of Commerce, Bureau of Economic Analysis under intra-Governmental Order Number SADPD-75-1, with the South Atlantic Division, U.S. Army Corps of Engineers, September 10, 1976 and Wollman and Bonem, 1971.

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